FEBRUARY 6, 1984 VOLUME 10, NUMBER 6A

COMPUTER

OFFICE AUTOMATION: GETTING THE LEAD OUT

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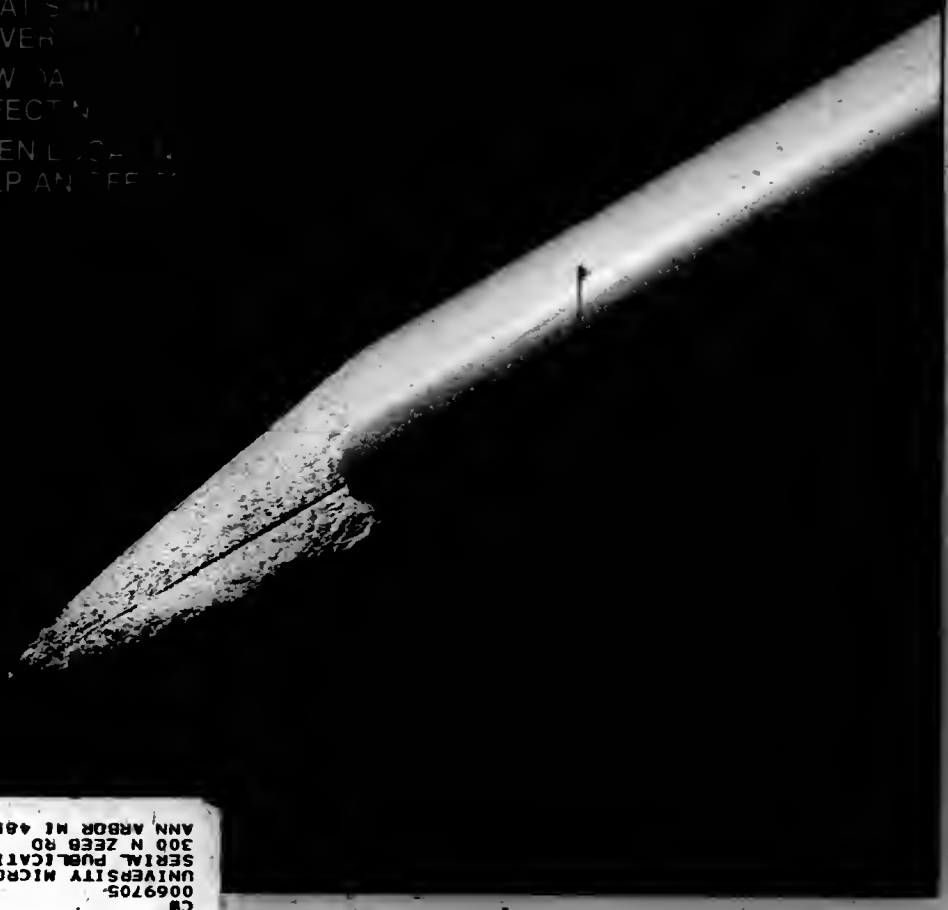

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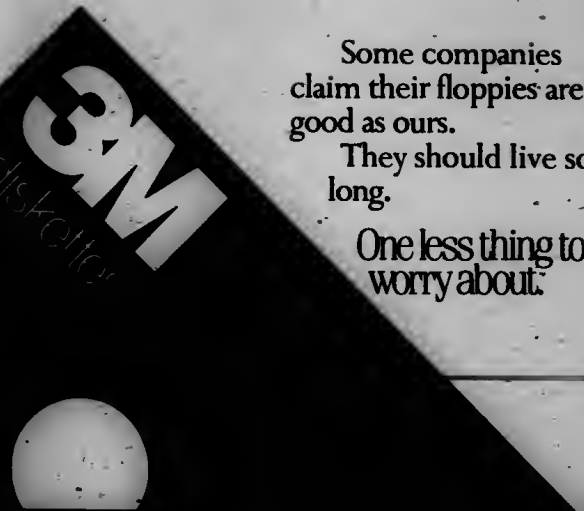

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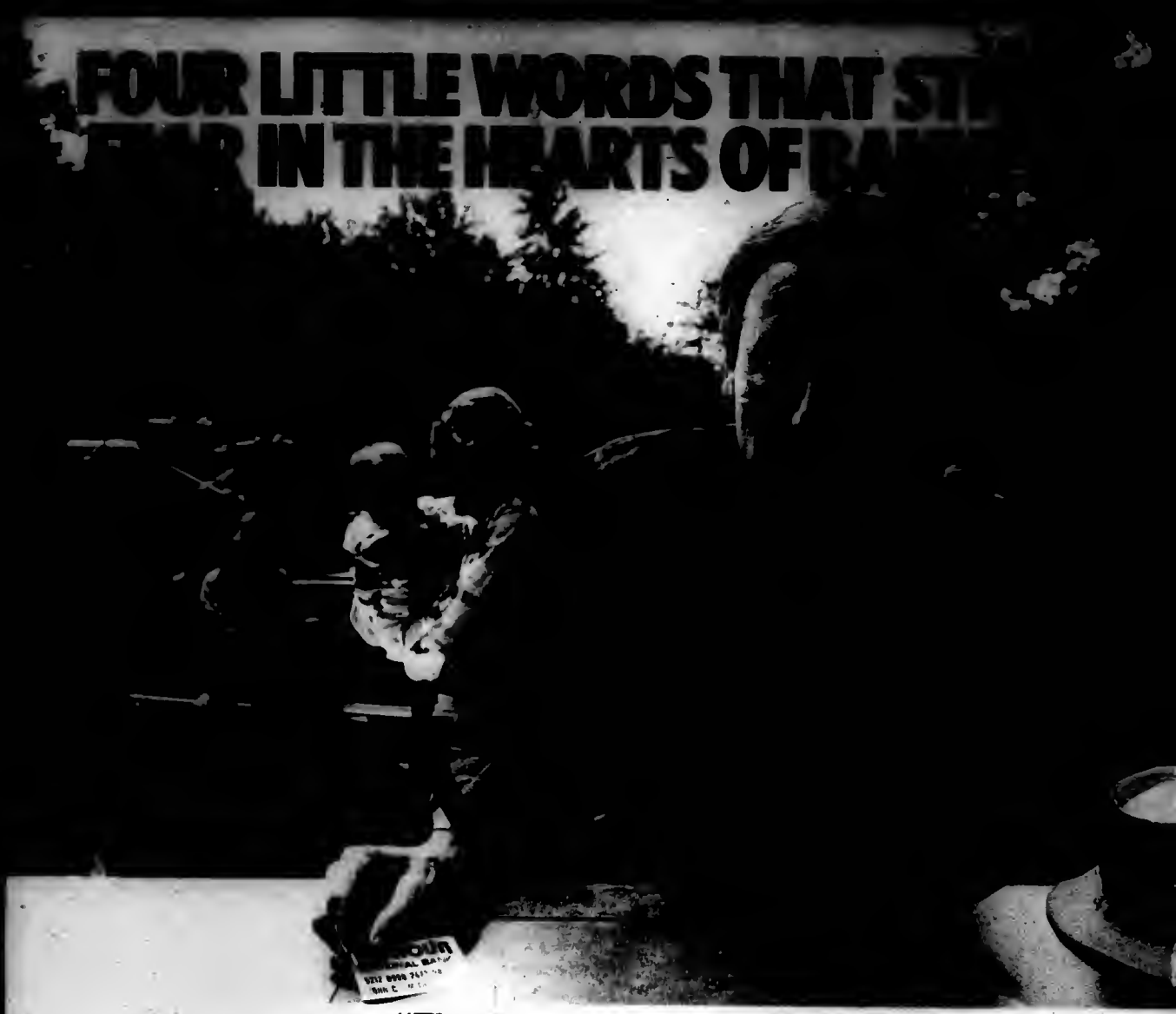

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Editorial

Get the Lead Out!

The information age is upon us, and MIS managers hold the key to unlock it. What's being done with this powerful resource can vary greatly, depending on the skills and farsightedness of the MIS professional in charge.

Computer technology has flooded the office — mostly in the shape of personal computers. The surge of computer capacity onto desktops has enabled capital investment per office worker to surpass that of the factory worker for the first time in history. The money is being spent, but what's being done with it?

Too many MIS departments are still playing catch-up with the personal computer. Taken by surprise by the end-user demand for computing power, many organizations are bringing in microcomputers at a fast and furious rate. What's happening beyond that? There is more to automating the office than the personal computer. New uses for existing equipment — bar code devices for recordkeeping, minicomputers and communications should be analyzed for effectiveness in your organization. MIS managers should beware of letting the surge of technology dictate their choices, possibly leading them down a blind alley until another surge of end-user demand takes them by surprise.

MIS departments need to become more politically savvy. They are caretakers of a powerful resource — information — and can use this resource to their own advantage as well as that of their organization. Resources attract allies, and allies can bring strength, accomplishment and rewards.

First, MIS needs to recognize the business needs of the organization and then objectively assess how the current equipment is meeting those needs. Next, find out what future business goals the company has and become familiar with developing technologies and new uses for existing technologies in order to adapt them to your needs. This may seem elementary, but too many MIS departments still operate in a reactive mode to management's demands or end users' cries for help. Step out from behind the eight ball and provide management and key user groups with a planned agenda for coming computer capabilities that are in line with the business need. Whether you decide to call it office automation or something else, the technology demand exists and MIS should be seen as one of the planners rather than as one of those holding back the inevitable.

By building alliances with top management and those departments most eager or those that will show the most immediate benefits, your position will be strengthened and your future possibilities expanded. This is too big an opportunity to miss — both for your personal career and for positioning MIS in the corporate structure. Don't let it pass you by.

Insider

Welcome Changes

By Tom Willmott

Over the last several years, the definition of office automation has changed dramatically. Practical implementations of the technology of the '80s, such as cheaper and more powerful microcomputer-based workstations, have made it possible to consider new applications that could significantly alter the quality, process and quantity of our work. Office systems planning issues now include microcomputer implementation and other types of small systems analysis, mainframe data access for end users (along with the acquisition of appropriate transaction-oriented, decision support software), the development of a wide range of brand new departmental applications and the traditional text creation and text retrieval systems. OA is about to become what it is supposed to be — the automation of business activities in the office.

The tools of technology — including a huge array of voice and data communications options, high-resolution displays, software that emphasizes the user interface rather than data manipulation and peripheral chips — have expanded management's view of the automated office. The implementation of new small and distributed systems will result in productivity gains at all levels.

Manual departmental systems (such as records management in a federal agency) are often critical, but few of these systems would be considered for the DP department's mainframe application queue. Large system development is expensive and time consuming. Many departmental applications have a unique character that defies translation into a mainframe DP priority. Now, because the cost of all types of small systems has continued to plummet, more of these unique task-specific applications become plausible every month. These small systems opportunities will become an integral part of OA; the age of the DP/WP multifunction terminal is here.

OA is rapidly becoming a module of the larger, enhanced information systems organization. This clear and steady shift in responsibility for office systems from an organization's administrative group to one charged with information systems or information resource management is another sign of the growing importance of distributed office systems in 1985.

The implementation of office technology will also soon contribute to a flattening of the organization chart. As the computerized reservation system changed the quality and quantity of work that could be accomplished by an airline or travel agency employee, so too will distributed computer resources in the office change the very nature of our decision-making work. Effective computerized information support for managers and executives will reduce the number of personnel in the office. Anyone who has attempted a departmental budget, first by hand and then with a micro spreadsheet package, will agree that more can be accomplished by a computer-equipped manager. As additional business applications are automated, employees will do different kinds of work. More time will be spent on analysis and problem solving and less on gathering data for presentation in one or two limited forms.

Finally, the evolution of communications technology is an additional element in our changed perception of OA. Dedicated peripheral chips such as the Seeq Technology, Inc. microchip (programmed with the logic of the Ethernet algorithm) and other expansion board technology have literally made it possible to communicate between the mainframe and the corporation's copier. Networks of personal computers, micro-mainframe links and communicating word processors are now in the vocabulary and on the planning agenda of office systems groups.

In summary, the new tools of office technology encourage us to imagine an expanded office applications portfolio. The new decision support systems have sharpened the corporate competitive edge by increasing service levels to existing customers and, in some cases, by creating whole new business product lines. The expanded applications have increased management awareness of technology and caused a restructuring of management responsibility. Office systems, after all, must be evaluated, acquired, implemented and maintained. We have witnessed a change in the role of the information systems staff with increased responsibility and visibility in communications, both voice and data. Clearly these trends demonstrate exciting new dimensions for the highest computer systems growth market in the '80s: robust, productive, cost-effective office systems.

Willmott is director of user research and services for International Data Corp. in Framingham, Mass.

Computerworld Focus

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Q&A

Danielle Barr is vice-president of office systems at Bank of New England, which has 4,000 employees across Massachusetts. She started two-and-a-half years ago as operations officer for an office systems group and is now responsible for office automation at the bank. She shared some of her experiences with Computerworld Focus.

Would you define office automation?

I don't like the term, but I'd define it as using the best tools to do the job right. We're trying to improve productivity by maximizing people and technology.

Why don't you like the term?

OA has turned off a lot of people. It gives the impression that you're going to change what's being done and breeds a lot of resistance. People tend to look at automation for its own sake, not for improving, maximizing, what they can do.

Is a redefinition necessary before real change can take place?

Not only a redefinition, but maybe a complete reorganization. Right now we're in the systems group and I'm glad we're there. We need to look not only at technological trends but also at sociological ones. What's happening to the work place and to the people here? What about change and organizational development?

Who will handle this reorganization?

It has to be in-house staff. Vendors are there to develop and sell new equipment to us. If developmg consulting groups to work with human resources meets a vendor's sales needs, fine. But it's up to us to find out if the equipment fits. If it doesn't, we shouldn't buy it. How are we going to bring it in and integrate it? The in-house staff has the primary responsibility for integrating. We shouldn't take on new technology if we're not totally committed to supporting it.

What about a smaller company?

The development of a user center is critical. Both small and large companies need a resource center, an area where people can come and get some help, some advice and maybe some assistance in developing their first applications. You're going to get better results if you're there with a carrot instead of a stick, saying, "Yes, do this and use this piece of software or hardware." When you say no, people go around you.

Sure, you need to protect your information and maintain data integrity. That doesn't mean people can't use tools; it just means they have to use them the right way. If we don't educate people we can't expect them to understand what data access, data integrity and data security mean. If you don't educate, you're avoiding the issue.

Are there people out there knowledgeable enough to staff a user center?

Yes. When we set up our first user center, we started with one person from word processing, two from finance and another who handled photocopying and microfiche equipment. Today, when we look for a new analyst, we look first to our user areas for someone who has good knowledge of the microcomputer.

You didn't mention an MIS person.

They didn't staff it in the beginning. Now we have three centers and some members of the DP staff do report to me.

What about a single-vendor vs. multi-vendor environment?

Standardization is probably the sanest route to pursue. A small organization can't afford to have many vendors and software packages out there.

What problems have you had?

The basic problem is communicating with the host. There are serious software problems and end users can't do it themselves. We've been working on one project for almost a year to perfect good data transfer from our host. It's going to be very slick, but it's not easy.

Software seems a bigger problem than hardware integration. Is it improving?

It's getting better. We're seeing more packages with everything rolled into one. PC Focus will allow us to receive information from Focus on the host and send information up and down easily. It's conquered many of the upload/download problems. An end user who knows Focus and can work on a PC can drop it into Lotus, into a text format, into an Ascii format. It's the closest thing we've seen to a product that could be integrated.

But you're looking for something else?

We're looking for something that's going to make file transfer from our host easier. Right now some packages treat the host as a virtual diskette. It's consumptive data transfer. We need some kind of a file server, a central resource so that when I want Lotus, I don't need to have disks sitting on my desk. I can go to my file server and pull down my spreadsheet, work on it and send it back up to my file server. Somebody else can also come and get at that worksheet, so we have shared files. At the same time, I want something that has file-locking and record-blocking capability, so if it is confidential nobody else can get to it.

What about user groups to share information?

There's a need, especially in the world of OA and micros. New professionals have developed and, although they may be in a department, they really don't belong in that department any more. They're microcomputer specialists. They want to keep developing models and programs and bringing in new equipment.

Do you see these people moving into a systems department or into something all their own?

Eventually they'll all come home to systems. We're going to see a complete circle. We have to look at this as part of the DP environment; otherwise, we'll be in an adversarial relationship.

Have you met resistance from traditional DP people?

We did initially, but being able to offer a micro solution when a mainframe solution just isn't practical has really helped. We have systems people working with us on new, exciting and different projects, and it's opening up a whole new world. We work with the computer room, the operations people, the network control people and, ultimately, the systems development people. It's helped win a lot of them over. We're finding solutions that can be done on PCs that don't necessarily involve the host and we can get some quick solutions out. It's an exciting place to be right now.

Manager's Corner

By Michael E. Lawson

As information and its effective use grow more important, companies are finding economic viability can turn on less than 1% of a market share. The line that separates survival and the all-too-frequent corporate reorganization is very thin, and long-range plans are essential.

Effective decision making will require substantial effort and careful planning. This task will become increasingly less productive unless information systems is carefully linked to the organization's overall plans. The information systems function must be incorporated into the business planning activity and must take the lead. Some generally agreed upon steps can help you to help your company.

First, know more about your organization's business. This knowledge is essential when you try to identify where and when the information systems function can provide strategic assistance rather than general support. You can gain this insight by examining the company's general business strategy. For example, does your organization provide a unique product, or is its general plan to be a low-cost producer of some rather generic product? The company's mission may be to be responsive to the market by providing new goods and services. Look at the underlying market for your company's product or service and find out the market growth rate and the company market share. A high market share and high growth rate spell significant information needs and importance; low market share and lack of growth often do not.

The second set of tasks requires an examination of the current evolutionary stage of development of the information systems function itself. If this is not part of your department's regular planning process, it should be.

You should now be armed with a good sense of the company, its strategic mission, its market and its goals. The next thing to learn about is the company's planning environment. Companies handle planning in a variety of ways. Some have corporate planning committees staffed by senior executives; others carry out planning as a staff function run out of the chief executive officer's office. Still others have a corporate development office staffed by a senior person. In most larger companies, the planning process has been institutionalized and is a regular part of the fiscal year's activities. Most companies plan from the bottom and make decisions and implement from the top down. The company's culture and management style and the size and complexity of the organization will probably determine the amount of effort put into planning and the amount of formal organization devoted to these tasks.

The third set of activities involves learning how your department or organization fits into this process. Who is the person in your reporting channel who is part of the formal or informal corporate planning process?

You need to meet with this individual to begin building links. If you work in a large organization, you may need to identify some intermediate person in your reporting channel who would carry out such a meeting. Prepare for this meeting by getting a copy of the latest corporate planning document. Review it carefully to identify corporate goals that will have a particular impact on the information systems function. Review those goals in terms of the department's ability to get the job done. With your own plans in mind, determine if there are priorities that would have to be rearranged or tasks that would not get done. This may be difficult because most of the company's goals will not be described in terms of information and system requirements — at least not yet.

Your initial efforts should be aimed at demonstrating two main points: First, you know about the company's business and information systems' role in that business, and, second, corporate goals can be better served if information systems plays a more active role in corporate planning.

Building these bridges between information systems and the organization will require patience and persistence. It can be a frustrating experience and must be entrusted to people with strong interpersonal and communications skills. However, the rewards can be significant.

Lawson is director of the Masters Program in Management Information Systems at Boston University's School of Management.

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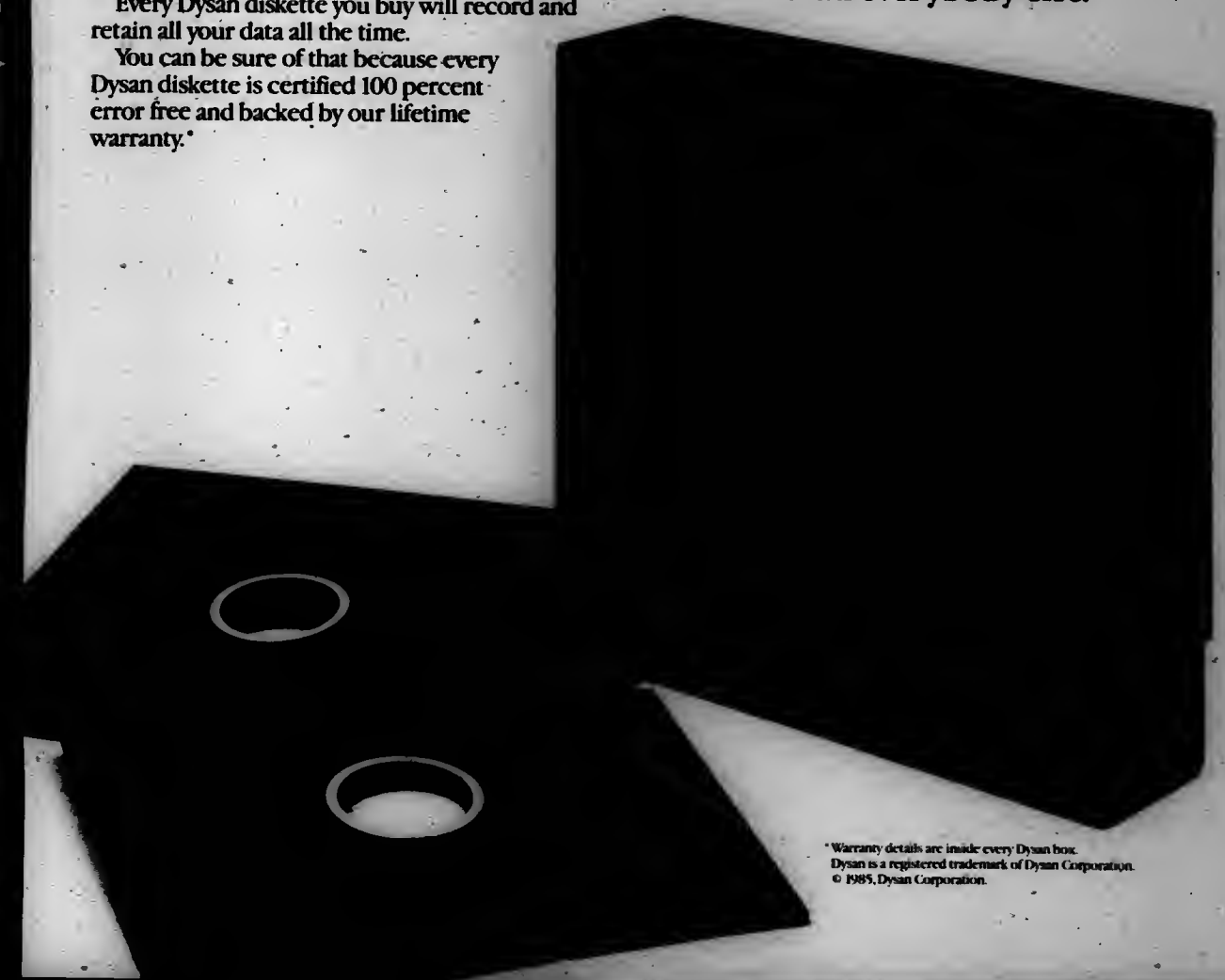

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In the News

Unions Mount Campaign

An 18-state campaign to protect the 10 million employees who use CRT terminals has been mounted by two national unions, the 850,000-member Service Employees International Union (SEIU) and 9 to 5, the National Association of Working Women.

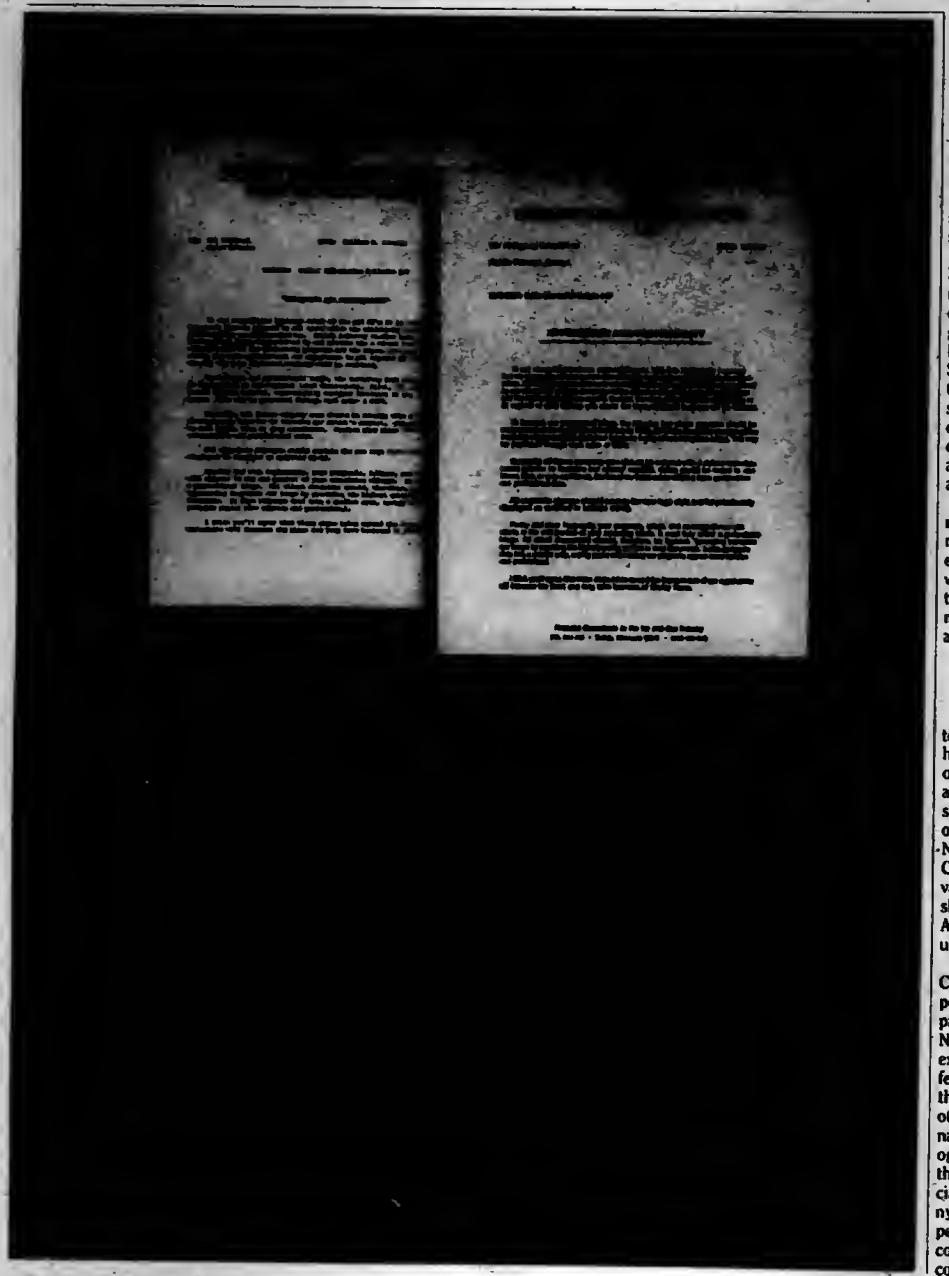
According to a SEIU representative, the goal of the campaign is to introduce two kinds of legislation regarding CRT safety. The first involves right-to-know laws.

The second zeros in on specific issues — the number of hours a person should work on a CRT without rest breaks, the right of pregnant women to transfer to jobs that do not require the use of a CRT during pregnancy and the use of nonglare screens and other ergonomic features.

Chris Funk, a member of the Research Department at the Washington, D.C. headquarters of SEIU, said Connecticut, Maine and Rhode Island had authorized studies of the problems associated with working on CRTS, and New York, Illinois, Oregon and Massachusetts have legislation pending.

Karen Nussbaum, executive director of 9 to 5, stated that, in addition to the more publicized problems (such as radiation emissions, vision problems and muscle strain) associated with CRT use, "the design of the job is an extremely important factor in the health and safety of workers. If there is a high degree of control, a high degree of involvement and some inherent satisfaction, the stress levels will be down. If the job is low level, the demands high and if there are production quotas, deadlines and high levels of supervision, there's high stress. Working on a VDT exacerbates all these problems."

Nussbaum referred to the Framingham Heart Study, which pointed out that a higher level of coronary heart disease was found in female clericals than was found in executives. She listed three factors that could improve the lot of CRT workers: better salaries, frequent rest breaks and better job design.



Hard Choice

What would employers rather spend money for: a new microcomputer or an additional staff person? More than 40% opted for the machine, compared with 13% who chose the person in a research-based program sponsored by Honeywell, Inc. The program studied attitudes among 701 knowledge workers in large Forbes 500 corporations. For the purpose of this study, knowledge workers were defined as professionals and managers who spend a large part of the working day dealing with verbal or mathematical information. Demographically, a vast majority of the respondents were male, over 75% were 30 to 59 years old, 80% had undergraduate or graduate college degrees and 75% earned more than $25,000 per year.

Major findings in the study included the fact that from 53% to 75% of the participants had access to personal computers, computer terminals or word processors. In addition, most of those surveyed believed they could complete more work in a given amount of time because they had office automation tools. Many also said the new technology had contributed significantly to their career advancement.

"The survey [also] revealed that knowledge workers gave high scores to management in introducing the technology into their organizations," said Eugene Manno, group vice-president of Honeywell's Small Computer and Office Systems Group. Manno added, "Conventional wisdom said that people would resist office automation. Our data shows conclusively that this has not been the case. But this data also shows that people are going to resist this technology if management ignores the human dynamic."

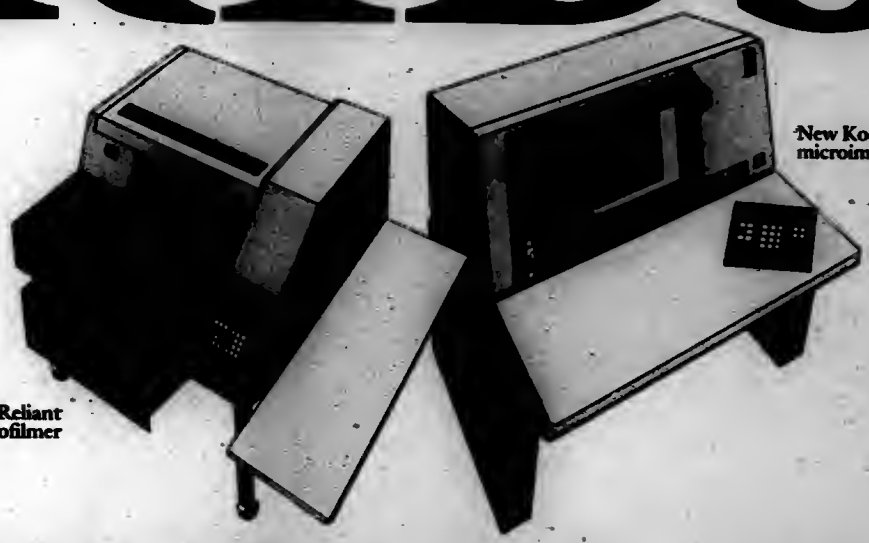
As if to underscore Manno's caveat, not all the news was good. When asked if management had realistic or unrealistic expectations about OA, 55% of those who answered "unrealistic" also said their companies paid more attention to machines than to the workers who operated them.

NBI + CCI = NCBCI?

Computer Consoles, Inc. of Rochester, N.Y., and NBI, Inc. of Boulder, Colo., have announced plans to merge the two office automation companies. Barring any snags and assuming the approval of shareholders, the merger would be based on NBI issuing 0.8 shares of newly issued NBI common stock for each share of CCI's common stock. The transaction is valued at approximately $160 million and should be completed by the end of March. A completely new name, not yet agreed upon, will be taken.

After the merger, Herman A. Affel Jr., CCI's chairman of the board, will be appointed to the same slot in the new company, and Thomas S. Kavanagh, head of NBI, will take over as president and chief executive officer. In a joint statement, Affel and Kavanagh expressed confidence that the two companies complement each other and represent a formidable combination of distribution, products, technology and customer support. "Based on these attributes plus our combined financial strength, we believe the new company will be in a stronger position to compete in office systems and advanced computing systems markets than either company alone would be."

Introducing the Kodak WHIZ KIDS



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In the News

Both companies had been considered prime acquisition prospects, according to the Gartner Group's vice-president, Tom Billadeau, who thought the merger has potential. "It seems clear that if NBI was going to merge with someone this was the last good year they could do it, and CCI had been looking for an opportunity for a long time."

Company officials stated that they expect very few changes in employment in their respective locations. Together, the two companies employ more than 4,000 people with more than 200 sales and service locations worldwide.

Industry analysts had heard rumors that AT&T had been looking carefully at CCI for possible acquisition. The merged company could prove to be even more attractive to AT&T in the future, analysts said.

BOC and OA

AT&T has made it clear that it wants a chunk of the office automation market, but it's getting competition from an unexpected source. The recently freed children, the regional Bell operating companies (BOC), have decided Ma Bell isn't the only telephone company that can sell office systems.

In December, Judge Harold Greene, responding to a petition from Nynex Corp., broadened its definition of customer premises equipment (CPE) that can be offered by the BOC to include computer products and systems "interconnectable to telecommunications facilities or used for communications functions." The filing allows the BOC to sell OA and some of them intend to do just that. Nynex, The Pacific Telesis Group, Ameritech, Bell Atlantic and Bell South Corp. have all begun to explore the potentially lucrative OA market.

Nynex, for example, the New York and New England regional company, has jumped into OA in a big way. It recently signed a three-year, $65 million contract with Data General Corp. to offer DG's Comprehensive Electronic Office System (CEO) to Nynex customers. DG has a similar agreement with Pacific Telesis, the western BOC. According to Nynex, CEO will become an integral part of Nynex's advanced Integrated Office Systems.

Nynex, in addition to its agreement with DG, is selling private branch exchanges from Northern Telecom, Inc. AT&T, Intecom, Inc., GTE and TIE. It has already sold OA equipment to such companies as Polaroid Corp. and Riley-Stoker Co. and has opened two retail stores called Datago, in which it is selling PBXs, personal computers, packaged software and extensive office equipment targeted to small businesses.

Consultants are not sure how much impact the BOC will have in the OA market. As Andria Rossi of the Seybold Consulting Group put it, "Initially, they won't have much impact because the PBX vendors have a lot to learn; witness AT&T."

The China Syndrome

In a country with more than a billion people, the need for temporary workers would seem unlikely. But sometime this year, Manpower, Inc., one of the world's largest temporary help agencies, will open up shop in the People's Republic of China. And though a nation that has taken a dim view of capitalism is unlikely to be at the forefront of office automation, the recent influx of foreign firms authorized to operate in China has dramatically increased the need for technically skilled office workers.

With this in mind, the government of China recently approached Manpower, Inc., one of this country's leading temporary agencies, to help alleviate the problem. Together, they established Manpower China Joint-Venture Co., Ltd., the first temporary help organization in China. The organization will be co-owned by Manpower and Consultec, an independent entity under China's Ministry of Foreign Economic Relations and Trade. The new firm will offer temporary Chinese office workers to foreign corporations and will also conduct OA training for selected workers from the Chinese labor force.

According to Mitchell S. Fromstein, president of Manpower, "Companies in China face a dire shortage of skilled office workers. This venture is a unique opportunity to apply the same basic concepts we now use in the Western world and Japan to an entirely new environment. At the same time, the new venture will allow China to build a labor force infrastructure that should help attract foreign companies to the vast China market."

Initially, the project will serve 600 foreign-based businesses in China, many of which are from the U.S. After that, the project will branch out to include Chinese companies.

According to Sharon Canter, an information specialist with Manpower, the first phase of the project will include a "select group" of 25 bilingual Chinese workers (fluent in both Chinese and the language of the firm in which they will work). These workers will be trained in all forms of office procedures — from basic photocopying to use of microcomputers.

Manpower intends to construct a model automated office, based on its successful training programs in the U.S., which will include microcomputers, word processors, data entry systems, copy and

(Continued on Page 45)

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By Bob Ericson And Wally Trapilo

"Audit me! Look, we're working under unbelievable deadlines with a budget and staff that's stretched to the end. We don't have time for this now, why don't you start somewhere else."

"Audit me! Hey, this is an MIS Services Department, not Office Automation. Why don't you go see one of the typists."

"Audit me! Sure, but you ought to know that I have a direct reporting line to the CFO and am matrixed to the MIS director, both of whom have approved my OA set-up."

The term audit seems to bring out the fears and anxieties of many people and often brings to light many of the issues it is designed to assess. The above three quotes point to a few of the concerns of a comprehensive audit. The first (too much work and too little time) is a symptom of scheduling and utilization problems. The second (this is MIS not OA) reflects symptoms of organizational confusion of function and perhaps lacks of integration. The third (I'm politically connected) reflects many of the bitter turf battles that have been fought over OA and its role on the organization. It is precisely in these circumstances that an independent outside audit is most useful.

Back in the good old days when life was simpler, office automation was simply another term for word processing. It was done on a single dedicated piece of hardware and had one or two trained operators. Its justification was that typing would get done faster and better.

Technology developed. WP had many alternatives in both software and hardware. For the commercial organization, large multistation systems that were part of local-area networks became available. OA also had the capacity to transmit information via fiber optics, satellites, microwaves or voice-grade lines to remote mainframes; to store masses of information; and to retrieve sections of the corporate data base to be incorporated into reports. Small, stand-alone personal computers put word and information processing into the hands of professionals who heretofore wouldn't consider using a keyboard.

What used to be a fairly straightforward concept of getting material typed faster has become a complex system of office support that in many cases evolved in a haphazard manner rather than according to a rational, planned approach.

The cost of uncoordinated and unplanned growth is often hidden in missed opportunities and subversion of policies. The following examples illustrate these points.

The Case of the Slipped Disk: In one company, management information systems (MIS) security would make Fort Knox look as easy to get into and out of as a wet paper bag. Password security existed at several levels and physical security was emphasized. No unauthorized entry was allowed to the MIS area, and packages and briefcases of every person leaving the company were searched for printouts or reports. No corporate data was to leave the premises. Then an integrated WP was installed; it gave executives and analysts the ability to time-share on the mainframe and to incorporate statistical data into operating reports. Many managers and analysts also had personal computers at home and would be able to work on their reports after hours. Some even had modems to allow direct access to the data base. The same security guard that confiscated printouts ignored floppy disks in briefcases. No controls existed on telecommunications access. In short, the OA system made the security system and related policies obsolete; this one was caught in time.

The Case of the Lost Legacy: In a legal department, a small group of secretaries maintained the department's correspondence, briefs and reports on magnetic media. Each secretary handled the work of one or two lawyers. All went well until one of the secretaries left. No standards were maintained for labeling and storing materials. Crucial materials for current work were "lost." Many weeks were spent reconstructing the files, and the department missed a few critical deadlines that eventually cost the company a great deal of money. Individualized personal systems of file storage and maintenance work only so long as the individual is there.

The Case of Haste and Waste: Department A communicated with field offices with a facsimile transmission device. Department B retyped materials on the electronic mail system.

Department C used a courier system. Each worked independently with little knowledge of the other department's effort. An OA audit revealed that each system was frequently overworked and many instances of underutilization occurred. A simple coordination plan eliminated many of the peaks and valleys of communication loads and problems.

Often companies that need it least are most receptive to and benefit most from OA audits. Improvements are often most difficult to bring about in companies that are fixed in their ways and afraid of change. When the director of MIS (or IS, OA or similar position) calls for an audit, the audit usually results in a statement that all is well or that a mutually developed plan of action will make things better. When the board of directors or the chief executive officer (or chief financial officer or someone in a similar position) asks for an independent audit, the results can be more traumatic. In the former case, the operating department managers are committed to doing the very best job for their organizations. In the latter case, senior management may be distrustful or dissatisfied with current operations. The audit may be a signal of drastic changes to follow.

As the information revolution of the 1980s progresses, the most profitable and growth-oriented companies will be those that have managed their MIS and OA in an integrated and intelligent manner.

By its very nature, an OA audit is tailored to an organization. Organizational complexity, services currently used, size and makeup of staff and degree of integration of OA and MIS all contribute to the formulation of a specific audit plan for a company. In general, however, an audit works as follows:

Preaudit Planning: Before the audit begins, specific planning must be done to assure that the most efficient approach is taken. The individual representing the company (the client) and the staff who will work on the audit meet to discuss the scope of the audit (what constitutes OA in this context or what aspect of the overall OA is to be reviewed). The auditor will acquire any written documentation of the OA program, including standards, objectives, budgets, training plans and accomplishments, MIS goals and objectives and corporate goals.

A preaudit strategy will also be developed. This will include how the audit will be introduced to the staff (a sensitive area); how issues such as security and access will be handled; who key individuals are and how they should be approached; what protocols are required for access to hardware and software; and, finally, what the final product of the audit will be, when it will be delivered and how it will be reviewed and accepted. In addition, a mechanism for change will also be developed. In OA audits, as with DP programs, the scope and nature of the audit will likely change during the process. A means to accommodate this change should be in place from the outset.

Prior to any on-site work the auditor must do a considerable amount of homework to become familiar with the client's materials and goals and audit objectives and constraints. From this, a specific work plan will be developed. Depending on the organization, this may be an interview schedule, work sampling techniques, surveys or other information gathering strategies.

These issues will then be discussed with the client to assure that the procedures will have the minimum impact on daily work activities while acquiring the most relevant information. The product of this phase is a detailed time-phased work plan with specific actions spelled out for both the auditor and the client.

The Audit: The audit is a comprehensive review of the OA environment, hardware, software, staffing and management as it currently exists and is planned for the future. Among the factors that are to be reviewed are the following:

- Standards — Do standards of equipment, software, procedures and responsibility exist? How well are they adhered to? Are more needed? Are some outdated?
- Physical Setup — Is the equipment (terminals, desks, phones, storage and so on) ergonomically designed for aesthetics and production?
- Storage Facilities — Is data stored in a secure and useful manner? Is an archival system in place to assure all required audit trails, reference requirements and backup are taken care of?
- Disaster Recovery — Is there a plan for recovery from fire, flood, vandalism, sabbotage or error? Is the plan managed (regular off-site storage and backup)?
- CPU Protection — Is the CPU adequately protected from environmental damage, such as heat, humidity and dust and personnel damage. Is it locked and physically remote?
- Daily Procedures — Are all libraries maintained on a regular basis? Are disks adequately handled and protected? Is labeling done according to standards? Is scheduling done to support business priorities?
- Equipment Utilization — Is the hardware being used to its maximum potential? Is the right equipment being used for the jobs required? Are there other applications that could be addressed by OA techniques?
- Planning — Are there long-range plans for OA that tie into the MIS planning? (For example, are OA plans tied into plans for fourth-generation language development and information centers?)
- Software Adequacy — Is the correct software being applied to current problems and to anticipated problems? One

(Continued on Page 14)

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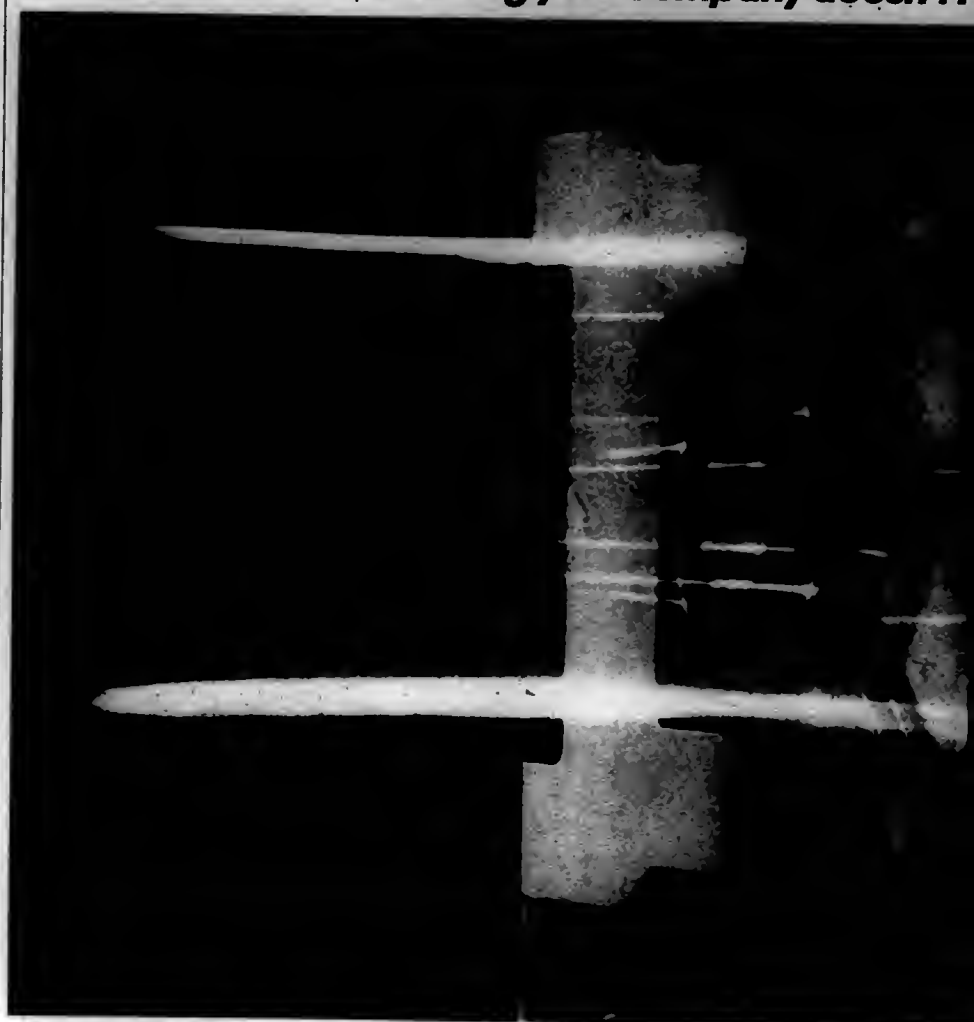

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Office Automation Audit Self-Test

Circle the most appropriate response for your company. Compare your total score with the scoring key on Page 14.

Standards

0 We don't have a formal set of standards for our OA hardware and software.

1 We have a corporatewide understanding that we will acquire similar equipment, but it is not enforced.

2 We have a set of standards for some equipment, but new technologies such as WP on personal computers aren't covered.

3 We have formal standards that have regularly scheduled review periods. They are comprehensive and accepted by all departments.

Office Environment

0 As new equipment is acquired we put it where there is room.

1 We try to keep similar equipment together, but haven't reviewed our overall facility.

2 Our department is arranged so work flow should be smooth and efficient, but we haven't reviewed the layout in a while.

3 Our layout is planned and reviewed on a regular basis. New equipment is fit into an overall master plan that takes into consideration both the work flow and the operator's working environment.

Media Organization

0 The secretaries use their own methods for cataloging materials. We don't have a common indexing of stored information.

1 Some of the secretaries are well organized and have structured indexing standards, but it's pretty much hit or miss.

2 We have a common cataloging policy that is not always followed, and finding things is sometimes difficult.

3 We have a well-organized information retrieval system that is managed on a daily basis. We have an access file cross-referenced by author, date and subject. We have established record retention and archival policies.

Disaster Recovery

0 We would probably lose everything if a disaster hit — fire, flood or the secretary leaving.

1 Our hard copies serve as our backup media, and we try to back up important disks when time is available.

2 We have an enforced policy to back up most of our important disks on a regular basis.

3 We have regularly scheduled backup of all key documents and data. We maintain off-site storage and a well-managed index of storage materials. Our retention policies are coordinated with legal and financial requirements.

Information Access Control

0 We really aren't concerned with access to our common or private libraries; any secretary can access and change any of the information.

1 We have a password system, but most operators know each others' passwords.

2 Our password system has been in place for a while, but not updated or changed recently. Frankly, we don't know if it's working.

3 We have a hierarchical password-protected security system with emergency access available only through a system's manager.

Office Automation Utilization

0 We use 10% or less of the equipment's and software's capacity or capability.

1 Our word processors are basically big self-correcting typewriters. We don't know what they are doing with the personal computers.

2 We use most of the features on our WP — pagination, chain filing, communications and so on. Similarly, the personal computer users are making use of all the functions.

3 We have a fully integrated OA system that ties our WP, mail, communications, remote processing and so on into a single comprehensive approach.

Planning

0 When the work load gets too heavy we buy more equipment.

1 We budget a year in advance to buy new equipment.

2 We tie our growth plan to the overall corporate growth plans. Equipment and staff are anticipated well in advance of need.

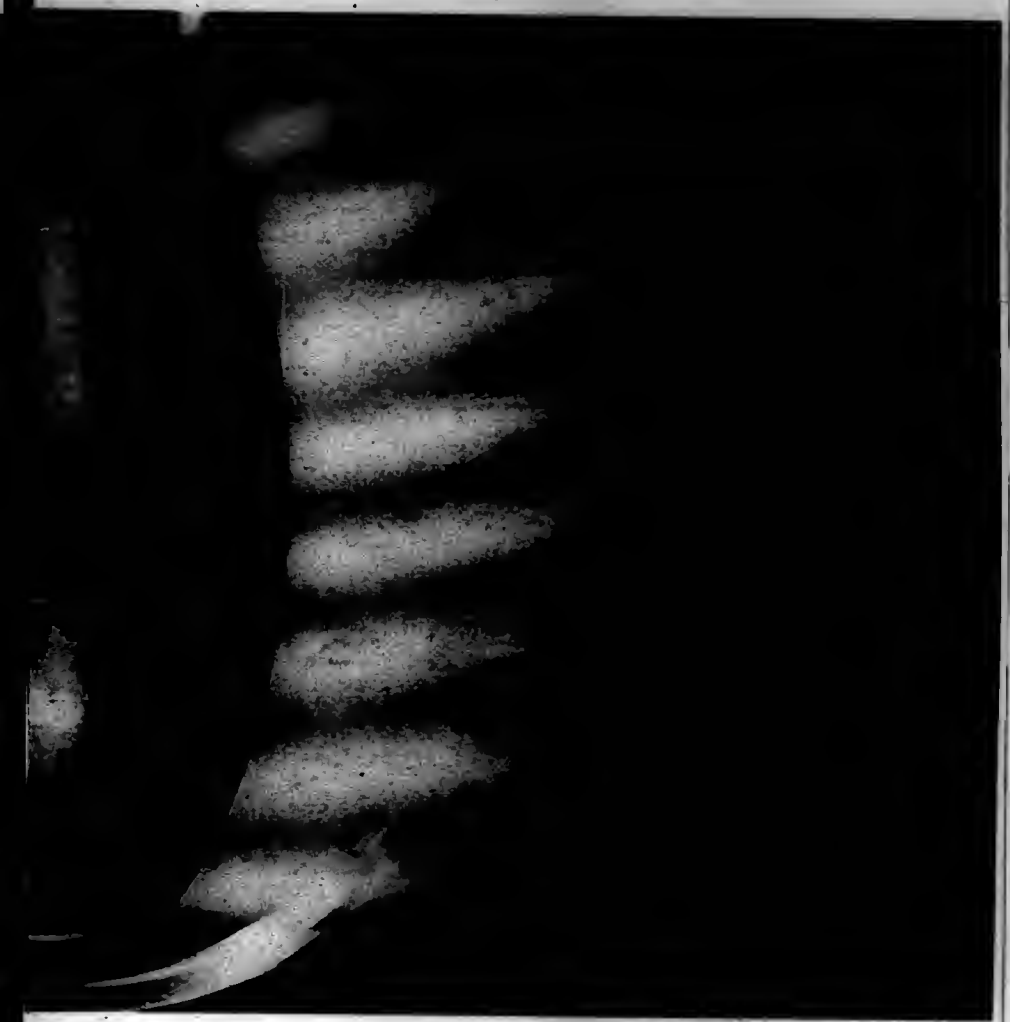
3 We have long- and short-range OA growth plans that tie in with corporate growth and MIS plans for information centers and end-user computing.

End-User Responsibility

0 Our end users have access to the corporate information/data base. There are no common standards on its use.

1 Some end users have developed information access/processing utilities that are not generally known. The data/information integrity is not assured.

business information systems.



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2 We have a common library of information access/processing utilities. End users remain responsible for use of information and quality of data used.

3 We have controlled access to the corporate data base. Common data and information extraction procedures are available, and corporate standards exist for their use. The techniques have been reviewed to ensure data integrity and timeliness for specific needs.

Software Adequacy

0 We have been using the same software for quite a while. No real thought has been given to improving our approach.

1 We look at new software from time to time as new brochures are sent to us or we hear of new products.

2 We have a users' group that meets periodically to review our systems — including software.

3 On a regularly scheduled basis we review our operations, company needs and resource levels. We consider our alternatives (tie in to mainframe, stand-alones, various vendors and so on) to assure that we have the best application software to address our information needs.

Staff Adequacy

0 When the work load gets heavier, we hire new staff. Most of the staff learn informally on the job.

1 We review our peaks and valleys of work and try to schedule staff accordingly. Most of our staff are trained when we hire them, or we send them to outside vendors for training.

2 We have an annual staff budget review in which we analyze our needs. We provide in-house training on our equipment.

3 We have long- and short-term staff requirement plans that include alternatives of part-time support staff. We have an internal training and support staff. Each OA user is formally trained, periodically evaluated and further trained on new software and equipment as it is acquired.

Scoring

0-10 Your lack of formality may be costing you a considerable amount of money. Your OA operation is at a substantial risk of not being able to provide you the support needed. There is room for considerable improvement.

11-19 You are most likely experiencing a number of nagging problems in getting work processed through your office. These problems could be eliminated.

20-24 You fall into the range of most large automated offices. While the work is progressing in a reasonable manner, there are a number of areas where improvements would increase your efficiency and effectiveness.

25+ Congratulations! You are one of the industry leaders in OA. We would like to meet you and help advance the state of the art.

(Continued from Page 12)

company was using a children's learning tool for WP because it was easy to learn — the cost in production time lost was very high.

• Staff Training/Skill Levels — Is the staff adequately trained on the equipment — not in terms of how much training they have received, but whether they can use the functions properly. Is management aware of the power of OA and using it appropriately in the administration of the business?

• Staff Adequacy — Are there sufficient numbers of staff, scheduled adequately to manage the department's requirements?

In a full audit, each of the above areas is reviewed by means of professional investigative techniques. Most important, the audit is conducted by a neutral party who has no vested political or financial interest in the outcome.

Audit Analysis: The investigator will gather information on each of the above areas and compile it into an informational source book. Data is then summarized and analyzed, system flows developed and preliminary findings reached. These findings are then discussed with the client to assure correct interpretation of data.

Audit Submission: The final analysis and recommendations are presented in a comprehensive report to management. The report contains findings as well as the specific steps required to correct current operating problems, in addition to indications of future needs and requirements.

Office automation audits are a proven preventive maintenance technique for OA managers to assure that current and future operations are proceeding in the most efficient and effective manner. A neutral, external observer is able to provide comprehensive professional appraisal of operations and give expert advice on alternative approaches to support overall business goals. Periodic audits should be scheduled into all offices that currently have or are planning to have substantial OA expenditures.

Ericson and Trapilo are consultants with the professional services group, Keane, Inc., a Boston firm that provides office automation and management systems consulting to industry and government.

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Integration: Avoiding Mistakes

By Jean Green Dorsey

Integration of new and old technology will become an information processing issue for any user living with or responsible for a dynamic system. Either you will plan for it, or you will find it will just happen.

Most situations where integration is an issue evolve because there is another generation, vendor, or design to be installed and the new "best solution" is different from the equipment already in place. The first decision point requires informed support, not only from top management but also from people who are regular or occasional end users of the system, regardless of their operational levels. All these people must provide management information systems (MIS) management with a charter that lets MIS know what the organization wants. Senior user management should require that MIS present a complete information package on available technologies. This package will provide the necessary background information to managers who must make bottom-line decisions about allocating scarce organizational resources. The package should

include a statement of need for the new system components, a cost/benefits analysis and a flow chart that shows how the project fits into the existing program. Provide a series of system alternatives and their consequences and make a system recommendation with persuasive support for your position.

Alternatives for dealing with the existing system at first appear limitless, but they fall into three categories:

- Leave it as is.
- Integrate it into the new system.
- Change everything to make it uniform with plan.

If the existing system meets the needs of the people it supports and if the health or productivity of the end users are not threatened, you can probably leave it alone. Considering the total resource expenditure, the difference the new system would make is not cost-effective enough to merit the change. Total resource expenditure includes hardware and software, the cost (time and money) of initial training, the cost of training new or additional operators, as well as management orientation and user training.

Integrating the existing into the new system is often not the result of a deliberate plan. The initial round of automated systems may have resulted from individual innovation or a small pilot that illuminated the benefits of computer-based support systems for the entire organization.

In this case, the investment has already been made. Smart user management should designate the responsibility for the development of a comprehensive plan incorporating hardware and software components. This is a major challenge. MIS managers may be tempted to "chuge" part of an automation design — usually the most difficult part, the applications software. This choice can relieve short-term pressures, but it will never allow maximization of a new investment.

Compatibility is a hot topic now. Everybody wants it, and most people have no idea how to test for it. Once achieved, compatibility most often does not live up to expectations. The easiest way to ensure compatibility is to use the single-source approach: Use one specific vendor. However, even the single-vendor choice is no guarantee that your company's requirements have been met in the best way or that various pieces of equipment from the same vendor will be able to "talk" to each other.

The single-source answer is an MIS manager's retreat from taking responsibility for providing the best solution at the best price. However, if a vendor can meet your specific requirements at a price that makes good business sense, it may be a wise decision to give that vendor all your business. If the vendor continues in business and continues to provide service, training and application production support, you'll get the credit for an excellent choice. Another attraction of this choice is the chance of developing real operational expertise as the types of equipment in the system decrease.

However, unless you want to be put in a position of defending a career decision that won't be easily defended, the vendor you choose had better be able to stay in business; recognize your value, both as a reference and as a major customer; and have a plan to provide the on-going customer support you will need. You may want to consider supplier alternatives. Equally important, most organizations have a variety of application requirements. In one New York agency, the primary vendor of the field network is IBM, but two workstation configurations — about 15% of the total — are best covered by Telex and Datapoint equipment. The three suppliers weren't happy when the city acquired its equipment accordingly, but the city reaped the benefit.

New York chose a general contractor to oversee this project, and all equipment, software, training and so on were subcontracted. General contractors are used more frequently as more comprehensive, complex and costly projects are undertaken and top management recognizes a need to assign project responsibility to a single source. This choice deserves consideration when a major project is planned in the absence of the usual resources of in-house

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Limited — but achievable — goals for compatibility are that all equipment in a given organization should be able to pass a data stream between peripherals. Some suppliers are promising such things as imbedded codes and formats, but these are icing on the cake. Now and for the foreseeable future, the major requirement for communications between dissimilar devices is the communication of occasional messages. If major documents, constant usage and complex formats are included in the requirements, minimal planning should dictate the choice of like devices for both sender and receiver. When compatibility is an issue, a company should insist on a "handshake" before buying any system, even if the arrangements are a little difficult for the vendor/supplier.

The third choice, changing everything to make the system uniform with the plan, appears drastic, but it may be the right answer. A new approach, with accompanying equipment, methods and procedures, is necessary when information and its effective processing are seen as critical organizational resources — for example, in the financial industry.

When the decision is made to change everything, integration issues still must be resolved. How will historical information be handled? What will be converted? When and how will all this happen? The key question is how critical and constant is the usage of "historical" information? It's often never touched after it's been filed. In those cases, a stand-alone version of the existing system can be retained for use when necessary. If such a system is not feasible, and the information must be available in editable form, contact a conversion service for a one-time cleanup. For confidential or proprietary information, conversion resources can be brought in-house and internal staff can be trained to manage it.

In such a big changeover, the schedule will have an impact on users; two situations should be considered:

• Installation Plans — Negotiate to have major cabling and electrical work done during peiods other than normal work hours and pay premiums for work done during those hours. Count on concentrated effort by the installation team. Many tradespeople will accommodate this scheduling. If these hours are not feasible, give users official written notification at least 10 work days before the planned installation.

• Loss of Support Services — Users should be able to move from the old system to the new without major processing disruptions. Plan to have a smooth dovetailing of any equipment changes with adequate testing time. Performance-based contracts can be a valuable tool to ensure supplier cooperation. If space requirements preclude parallel operations, plan on a backup system for any portion of the information processing process handled by the part of the new system not yet fully tested. In general, you need a backup program for every component of your information processing system. Consider a brother/sister scheme — you provide backup for someone else and they do the same for you.

Do not be discouraged by innovation. If you're ready to take on that responsibility and have reason to believe you'll get good support from your supplier, being a Beta test may even be the way to go. The decision should be made according to whether the value of the innovation is worth the extra effort to implement? If it's worth it, by all means go for it!

Integration is one of the most misused words in our vocabulary. OA technology provides the chance to use it in its purest form. In the role of user, senior management needs not to do more than demand a plan that incorporates system integration. Management should also think about changing the meaning of MIS from management information systems to management information services. The concept of service would then be a natural part of the planning process.

Dorsey is computer systems manager with the city of New York and a senior consultant for the Institute for Management Development.

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A High-Level Approach To Local-Area Nets

By Wayne Russell

A widely held myth in the area of office automation says that selecting a local-area network for OA use is as easy as choosing the latest local-area net technology that supports the highest bandwidth, a large number of devices and multiple information types, such as voice video and data.

Over the past several years, this myth has become more popular. Only recently have organizations realized that the preoccupation with the physical aspects of local-area network technology can have negative effects on OA plans as additional people are brought on line.

A company that is selecting a local-area network as the communication vehicle for its OA system should first determine which local-area net technologies are capable of meeting its business objectives and OA requirements. Issues related to higher level services (file transfer, electronic mail and terminal emulation), needs, risks and benefits should be resolved before the local net is purchased. At this time, the company should also address other issues regarding the technical and operational aspects of the physical network.

Too often, organizations discover after installation that other issues should have been resolved before the local net was procured. The integration of OA and local-area net technologies is a two-level problem. On one level, it appears that only the technical issues (topology, bandwidth, RS-232, voice, video and data choices) need be navigated to ensure a successful endeavor. However, lurking below the surface is the reality of local-area network/OA integration: the operational and higher-level protocols and standards issues. For example, the operational issues of the charging policy and network control are sometimes foreign concepts to newer local-area network vendors. Many pioneer local-area network/OA organizations thought about and developed these mechanisms only after initial implementation. In contrast, major private branch exchange (PBX) vendors have built maintenance and control mechanisms into their turnkey products. End users of the less mature local-area network technologies should be aware that these services will be needed and planning for them must precede implementation.

Examining some basic issues of local-area network/OA integration will add a useful perspective to this discussion. Four years ago, local-area networks were in their infancy. When OA managers talked about introducing them into the work place, they emphasized technical characteristics (topology, access method, bandwidth) as the primary driving forces. Soon after, these managers found they needed to add highly specialized personnel to support the local-area network in a universal manner similar to telephone support. It was at this point that the operational issues came to the forefront.

In the past two years, issues related to higher level protocols and standards that support an organization's OA strategy have received more attention. A key example of this new awareness is IBM's Personal Computer networking product based on the Sytek, Inc. local-area network. Higher-level services related to shared resources such as file and print servers as well as network control will come with the standard product. The ability to procure needed services while reliably maintaining and controlling the local-area network at the least cost should be a major concern to the group responsible for the integration of local-area network and OA technologies.

Examples of higher-level services implemented by the various protocols used in your organization's OA strategy include the following:

- File Transfer — facilitates the movement of text, data or other information between host resources on the local-area network.
- End-to-End Encryption — allows information to be protected as it moves through the local-area network.
- Virtual Terminal — similar to a protocol converter. Local-area nets implementing this service hide differences between terminal types when communicating with various hosts.
- Gateways — provide links between local-area network/OA systems and public data networks.

Depending on the particular local-area network/OA system, these services could reside in various forms on personal computers, multiuser microcomputers, large host computers or the network interface unit (NIU) of the local-area net; all should work in harmony. End users should realize that these higher-level services are typically not contained as part of the local-area net. Most local nets are basically mechanisms upon which you implement these services. Many local-area net products implement lower-level protocols (for example, the IEEE 802 standards) to transport packets of information throughout the network at a high speed and without loss of data.

The successful merging of OA technologies (personal computers,

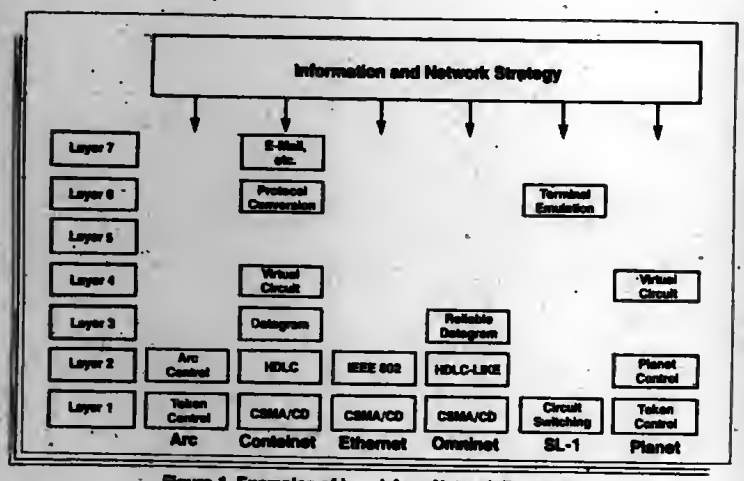

Figure 1. Examples of Local-Area Network Protocols

minicomputers and so on) and local-area network technologies is based on an understanding of where the various protocols and services reside and how they all work together.

Today, at least two models are available which the local-area network/OA planner can utilize to partition these services and protocols. The first is the ubiquitous International Standards Organization Open Systems Integration (ISO/OSI) Reference Model. The second is the Department of Defense (DOD) Internet Model upon which the Transmission Control Protocol/Internet Protocol (TCP/IP) suite of protocols is based.

The ISO/OSI and DOD Internet models, which use seven and four layers respectively, both address all services discussed here.

The model defined above addressed all the necessary services needed in local-area network/OA integration. It is interesting to note the gaps left when an organization implements a local-area network without concern for where the higher level protocols and services will reside. As can be seen with many of the products in Figure 1, the organization is left with a partially implemented system.

Mapping a local-area network/OA strategy to the DOD Internet or ISO/OSI Reference Model is not a rigorous methodology; organizations that take the extra step of examining higher level protocols and services within the scope of one model or another will have an early warning about the areas of their strategy that cannot be fully implemented via today's technologies.

To summarize the higher level protocol approach to local-area network/OA integration from a performance and business point of view: Know your OA requirements, map these to the appropriate model and, finally, select a local-area network that will best mesh with the requirements you have outlined.

On a more practical level of today's local-area network/OA market, it can safely be said that in most cases, local-area network vendors and OA vendors operate mutually exclusively. Some vendors, however, have begun to realize that using layered protocols in OA and local-area network architectures can make high-technology products more easily marketable. They are also finding that it makes them more easily adaptable to new local-area network technologies.

One example of an OA vendor that has adapted industry-standard higher level protocols to its product offering is Computer Consoles, Inc. (CCI). CCI uses the DOD's TCP/IP suite of higher level protocols to support its OA product, Officepower.

Using these protocols has provided CCI the flexibility to utilizing a multitude of local-area network technologies.

Because CCI and other vendors have defined the higher level protocols initially, they now have the flexibility to integrate more easily with an appropriate local-area network technology capable of improving the efficiency and performance of their products. The organization that uses this approach will give itself a similar flexibility.

Another example is an organization that selected a local-area network based primarily on its technical merits (extremely high bandwidth and the "potential" to support voice, video and data).

In all fairness, this organization is and was a pioneer in the integration of local-area network and OA technologies. Many of the lessons it learned formed the basis for this article.

This organization selected a broadband bus local-area network, the Sytek Localnet 20, typically used for terminal-to-host communications. The Localnet 20 utilizes proprietary protocols up to equivalent session level (Layer 5) of the ISO/OSI model.

After the installation of the Localnet 20, this organization procured CCI's Officepower product. The TCP/IP suite of protocols (Layer 4 and above) expected a datagram service at Layer 3. Because the Localnet 20 products provided proprietary protocols up to Layer 5, there was no convenient way to access the Layer 3 datagram service.

The resultant implementation can best be characterized as a "work-around" to the problem. Extra protocols header and trailer information is now attached to all user data. The final result in this organization is a less than optimal solution. Efforts are now under way to utilize other vendors' NIUs which allow access to the needed datagram service.

It is estimated that local-area net network throughput could be improved by more than 10 to 100 times through the use of local-area network products that more closely match the CCI higher level protocols.

If your organization is considering the marriage of local-area network and OA technologies, it is important to remember these issues and that the use of a higher level protocols approach will aid tremendously in the long-term relationship of your local-area network and office automation products.

Russell is senior consultant with American Management Systems, Inc., a consulting firm based in Arlington, Va.

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What's Up, DEC?

PHOTO © 1985 ALEX FRIEDMAN

DEC President Kenneth Olsen seems pleased with his company's progress since the dark days of 1983.

Three years ago, DEC wasn't known as an office supplier. Now it's one of the top four.

By Glenn Rifkin

As 1985 unfolds, Digital Equipment Corp., the world's second largest computer company, has quietly positioned itself to have an exceptional year. After suffering the slings and arrows of both the computer press and industry analysts 16 months ago, DEC regained some of the shine that it emitted during its rapid rise in the 1960s. With more than 90,000 employees and pushing past the $6 billion mark in revenues, the huge Maynard, Mass.-based firm continues to grow at 20% to 30% annually and has won praise for its rapid turnaround.

Though it has yet to solve its personal computer dilemma, DEC has solidified its product line and strategy, has restructured its internal accounting procedures and will likely sell out every 8600, the new top-of-the-line VAX, that it can produce. In addition, DEC is establishing itself as a force in the office with an enhanced All-In-1 product, solid networking solutions and more connectivity to IBM than anyone else in the market, according to consultants.

Such a stellar report card seemed unthinkable in late 1983. DEC's crisis of confidence centered around a bad economy and its disastrous entree into the retail personal computer arena. Compounding that was the delay of the 8600, which DEC's customers desperately awaited. And topping things off was a single poor fiscal quarter the company failed to anticipate, thus raising the ire of Wall Street.

DEC President Kenneth Olsen and other company officials maintain that, though DEC made mistakes, the bleak picture that was being painted was an overreaction. "We had one bad quarter and as companies go, that quarter wasn't all that bad," Olsen explained. "People wouldn't have noticed it particularly except that we were getting beaten up because personal computers were everything at the time, and we were on a track of big computers, integrated systems and communications."

Obstacles remain, however. Internally, DEC continues to reorganize. Though the company lost several key players, Olsen pointed out that he still has access to the best people at every level. Departures were inevitable when the company began to restructure from as many as 38 individual organizations to one solidified unit, he said and added, "Entrepreneurs don't make good businessmen."

In addition, DEC continues to receive criticism for lack of a cohesive marketing strategy and for not selling aggressively enough outside its customer base. It is also still attempting to shed its reputation as a scientific/engineering vendor in order to be taken seriously in the office market. "That's a very old stereotype," stated Robert C. Hughes, vice-president, marketing, for DEC's Office Information Systems group. "I'm not sure how much money it's going to take to change it. We're the second largest computer company in the world and, regardless of what industry you pick, we're first or second in that industry. We're the second supplier in the Fortune 1000, and it goes from the front office down to the lab."

As 1985 begins, that word is spreading. Among the market segments in which DEC has made the greatest strides is the office. According to Hughes, three years ago, DEC wasn't even known as an office supplier. Despite its problems, DEC has managed to jump in among the top four office suppliers in the market. Analysts estimated that DEC's office sales totaled nearly $1.5 billion in 1984, and Hughes is intent on even greener pastures. "Three years from now, I'd like people to say we are definitely number one or two in office systems," he declared. "That's a big challenge."

Industry analysts agree but tend to feel that of all the challengers to IBM, DEC has the best shot. "DEC is well positioned to sell office automation because they now understand who they are selling to and have a better feel for what the market needs," said Tim Caffrey of International Data Corp. (IDC) in Framingham, Mass. "A couple of years ago they thought throwing things on people's desk meant OA. Now they are focusing on moving VAXs with workstations running All-In-1. That is their traditional strength and it makes a lot more sense."

According to a recent survey by the Yankee Group, DEC ranked first among all office vendors in a rating of departmental system solutions.

The survey measured criteria such as networking, Systems Network Architecture (SNA) support, processor range, integrated applications software and price per user, and it gave DEC a 4.0 rating on a scale of 5.0. Data General Corp. finished second with a 3.7 overall rating.

"Across the board, DEC's product offerings are stronger than any other vendor including IBM," stated Peter Lowber, senior market analyst with Yankee Group.

DEC's office strategy is simple, according to Hughes. Rather then pushing a system into a customer's lap, DEC takes the "warm armpits" approach: Get close to the customer and find out what problem needs solving. "The tools you give people must support the way they work," Hughes said. In that context, the strategy is a five-fingered one consisting of dumb terminals, personal computers, communication products, departmental computers and networking capabilities — all tied together.

The strategy, called All-In-1 (not to be confused with the software product of the same name) positions the five fingers under a single umbrella of VAXs and the proprietary Digital Network Architecture. "People buy the All-In-1 concept; they don't necessarily have to buy the product. You can have a big office system from DEC without All-In-1 on it," said Hughes.

All-In-1, the software product, is considered by DEC to be the key element in its office strategy, however. Though its first release, offered in June 1982, was considered inadequate by many consultants, All-In-1 was well received by customers. In his January 1984 issue of *Monosson On DEC*, Sonny Monosson wrote "With All-In-1, DEC appears to be in the right place with the right product at the right time. DEC has scored a major coup by commanding a lead in this market."

An estimated 1,200 installations of All-In-1 are currently in place (outselling both DG's CEO and Wang Laboratories, Inc.'s Wangoffice). In December 1984, DEC unveiled Version 2 of the system which has met with more than favorable reviews.

"The first version didn't satisfy my requirements," said Andria Rossi of the Seybold Consulting Group, Inc. "But I'm quite pleased with Version 2. They have filled the gaps, and there is now a consistent user interface across the product line. They are great enhancements."

"The enhancements to All-In-1 really help," added Matt Meehan, a computer analyst with Salomon Brothers, Inc. in New York. "It's a good product, and I expect it to be well received."

All-In-1, which runs on the VAX/VMS operating systems, is essentially an integrated electronic mail and word processing system. With the enhancements, DEC has added to the consistency of the menu-driven interface, added interrupt capabilities, network-wide calendaring, fully integrated computer-based instruction, along with an integrated voice and WP option.

DEC's new integrated WP package, WPS-Plus, a Decmate-style package that features a scientific/technical character set, is also available as an option. Adding a bit of sizzle, DEC also incorporated its Dectalk Mail Access and Voice Messaging Support options to the system along with an innovative videotex system for corporate information sharing.

DEC offers a wide range of processors to power All-In-1 — from the new 8600 (yet to be delivered) down to its personal computers. Though All-In-1 currently does not run on the DEC Rainbow, Hughes indicated that that capability would be available this year. The eight-year-old VAX has continued to sell strongly despite complaints from competitors that it lacked current power requirements. The long-awaited (delayed a year and a half) 8600 addresses that issue for DEC.

"IDC believes that DEC will sell every 8600 it can make," said Caffrey. "And high-end sales can definitely lead to OA sales."

At the low-end workstation level, however, DEC continues to face severe questions. The Microvax, which brings the power of the VAX to the desktop, has been well received, but it is expensive ($14,000) and has not yet been clearly positioned in the office. The personal computers, the Rainbow, Decmate II and III, and the Professional 350/380 have had varying degrees of success, but have caused great confusion for end users.

Hughes insisted that personal computing and personal computers are "not mutually consistent words." Personal computing, he explained, does not require a personal computer and can be done using VT 100, 220 or 240 terminals on a departmental VAX. "That part of our business is growing as fast as the personal computer market."

"They have a gap at the low end," argued Caffrey. "People are looking for a powerful workstation to take the burden off the central processor whether DEC likes it or not."

The Decmate II, a dedicated WP machine with a few personal computing options, has done quite well, according to Hughes. "Decmate, in terms of revenues, is a Fortune 500 company by itself," Hughes stated.

The Rainbow (which Hughes pointed out was never intended to be part of DEC's office strategy) has continued to have problems. Its foray into the retail market was a disaster — "We lost our shirts in that market," said Olsen — and has not sold well even to DEC customers.

Despite this, Olsen is committed to a personal computer product. "We went into personal computers, and we are planning new machines, as terminals for our VAXs. It is an important part of our strategy."

In the office, the Rainbow created problems. "We either misread the market or mismarketed it," said Hughes. "The mix of Rainbow sales was just the opposite of what we thought it would be. Seventy-five percent of them went to larger accounts. Customers said 'I got this thing from DEC and I bought it with a WP product on it. What are you going to do to make it part of your integrated office system?' And we're committed to that."

Though DEC won't discuss unannounced products, the company is currently working on its Rainbow 25, rumored to be an IBM-compatible machine that combines the features of the Rainbow and Decmate into one unit.

At the low-end workstation level, DEC continues to face severe questions. The Microvax has been well received, but it is expensive. The personal computers have had varying degrees of success, but have caused great confusion for end users.

"I acknowledge that I need a product to replace the Decmate and the Rainbow," Hughes admitted. "I acknowledge that it has to have that kind of capability on it. But there are a lot of different ways to solve that problem. It's very important that whatever product we come out with be tightly integrated into our own strategy first and also support whatever the industry standard product is."

Industry watchers suggest that DEC settle on either the Microvax or the Pro as its low-end workstation, lower the price to compete with IBM and focus its marketing on that machine rather than continue the confusion. "It's frustrating because they have the product and a window of opportunity," said Lowber. "It's just a matter of taking advantage of it."

In networking and connectivity, DEC is taking advantage. The Yankee Group's survey lauded DEC's networking capabilities and SNA support, giving the company top ratings in both. Decnet, the proprietary networking architecture software and hardware introduced in 1976, is "superior to any other minicomputer offering," stated Lowber. "It has a large installed base (over 20,000 nodes) and supports a broad range of processors." DEC also offers a Decnet/SNA gateway, which features a network-to-network rather than point-to-point design.

"Our customers have told us that their Number One need is a multivendor network," declared Maureen Lawrence, product marketing manager of DEC's networks and communications marketing group. "The MIS manager wants to be able to communicate worldwide and maintain transparency." DEC is involved in both gateway approaches and international standards solutions for networking, Lawrence pointed out.

Perhaps most impressive to consultants is DEC's connection to the IBM world. Last October, DEC announced three new IBM interconnect products including DDXF, a Disoss document exchange facility which allows users on a Decnet network to exchange final form documents with an IBM office systems network. DEC also introduced the Distributed Host Command Facility, which allows IBM 3270 users in an SNA environment to connect to a distributed VAX network; and the VMS printer emulator, which allows users to print information from an IBM mainframe on a high-speed printer connected to a VAX.

With its ability to run Disoss, DEC is at least a year ahead of the other minicomputer vendors in that area, Lowber insisted. "DEC is today where IBM wants to be," added Meehan.

DEC has also expanded its commitment to Ethernet, the local-area network. According to Lawrence, DEC has more than 10,000 computers on Ethernet connections and is extending Ethernet to broadband. "If IBM comes out with an accepted standard, we will interconnect to it as well," Lawrence said.

DEC recently forged an agreement with Vitalink Communications Corp. to market a product called Translan, which allows a transparent interconnect of local-area networks via satellites.

Despite its success with technology, DEC continues to be chastised for the lack of cohesive marketing strategy. Said Rossi, "Advertising and marketing simply haven't been where they should be for DEC to be Number One." "They have to pull the team together and get a focused message across," added Lowber.

Henry Ancona, product group manager for office systems, believes that DEC is doing that, but not by conventional means. "Marketing means listening to your customers," Ancona explained. Rather than spend millions on television advertising, DEC prefers to target its potential customers at trade shows, with direct mail, and at executive seminars and company-sponsored expositions such as the recent Decworld in Boston, Ancona said. Olsen agreed.

"IBM doesn't market their big systems on TV," Olsen declared. "With our kind of marketing, we introduce a system to a company and ask them to grow with us. At Decworld, we had 12,000 people who had specific technical needs. And all the Charlie Chaplins in the world couldn't have gotten our message across because those people knew exactly what they wanted."

Hughes is not convinced. Though he noticed no particular reward from DEC's television advertising in 1983, he acknowledged that it may be necessary. "Running this group, I think we need it," he said. Though MIS managers tend to know DEC, middle-level clerical people who are often key members of OA committees still don't know the company. "I'm not sure what we are going to do yet, but we are looking at ways to test the TV campaigns to find out what they do for us."

Hughes admitted that DEC is hesitant to blow its own horn when landing large accounts as do its rivals. "I'm sorely tempted to do it, but it's not my style," he said.

This low-key approach has frustrated consultants.

"DEC has an incredible window of opportunity in the next two years," Lowber stated. "To really take advantage they need new accounts, and to get them they have to let people know they're not the old DEC anymore. But they have lots of potential, and they *are* going to have a good year."

Rifkin is senior editor at Computerworld Focus.

You Can Get There from Here—OA Survey Shows How

By Lee White

Only five years ago, office automation consisted of little more than some stand-alone word processing machines that were operated by the same people who had previously worked on typewriters. What had been the typing pool emerged as the WP department, and the office manager became the WP supervisor.

But all that is history now, according to 23 large businesses and universities surveyed by *Computerworld Focus* in the last weeks of 1984. New technologies have become entrenched in organizations throughout the country. Equipment has been tested, enhanced and replaced. Management responsibility for OA has exited the WP department and climbed the corporate ladder. The number of users of OA hardware and software tools is approaching 50% of the white-collar workers, according to some survey respondents. The information center, nonexistent in 1980, is flourishing and creating a new category of professionals. And, in general, in-house OA personnel appear pleased with the support provided by hardware and software manufacturers.

The most obvious changes have been in equipment and how it is used. The survey found that stand-alone word processors, whether automated typewriters or CRT-based machines, have been replaced by shared-logic systems or personal computers. The shared-logic systems, which had been used predominantly in WP centers, are rarely found in a centralized location today. In most cases, the centers were supplanted by satellite WP stations. Companies that have large, shared-logic systems will probably keep them, and some are adding terminals as the need arises. Most respondents, however, said they believed the personal computer will become the secretarial workstation of the future if WP software continues to improve.

The in-house OA people have more in common than their views on trends in WP. About 50% of those surveyed are members of the management information systems (MIS) department, another 40% belong to the OA or office systems area and the remainder are heads of information centers and generally report to the head of the MIS department. These people most often carry the title of manager, although almost as many are directors or vice-presidents. At least one IBM mainframe can be found at all their companies and almost half of them also have Digital Equipment Corp., Prime Computer, Inc. or Hewlett-Packard Co. minicomputers.

These mainframes and minicomputers are handling very little WP, but they're doing tremendous amounts of decision support. The most frequently mentioned tools were Ramis (Mathematica Products Group, Inc.), Focus (Information Builders, Inc.), ADRS and APLDI (IBM) and Easytrieve (Pansophic Systems, Inc.). In the organizations surveyed, there is not a great deal of electronic mail soft-

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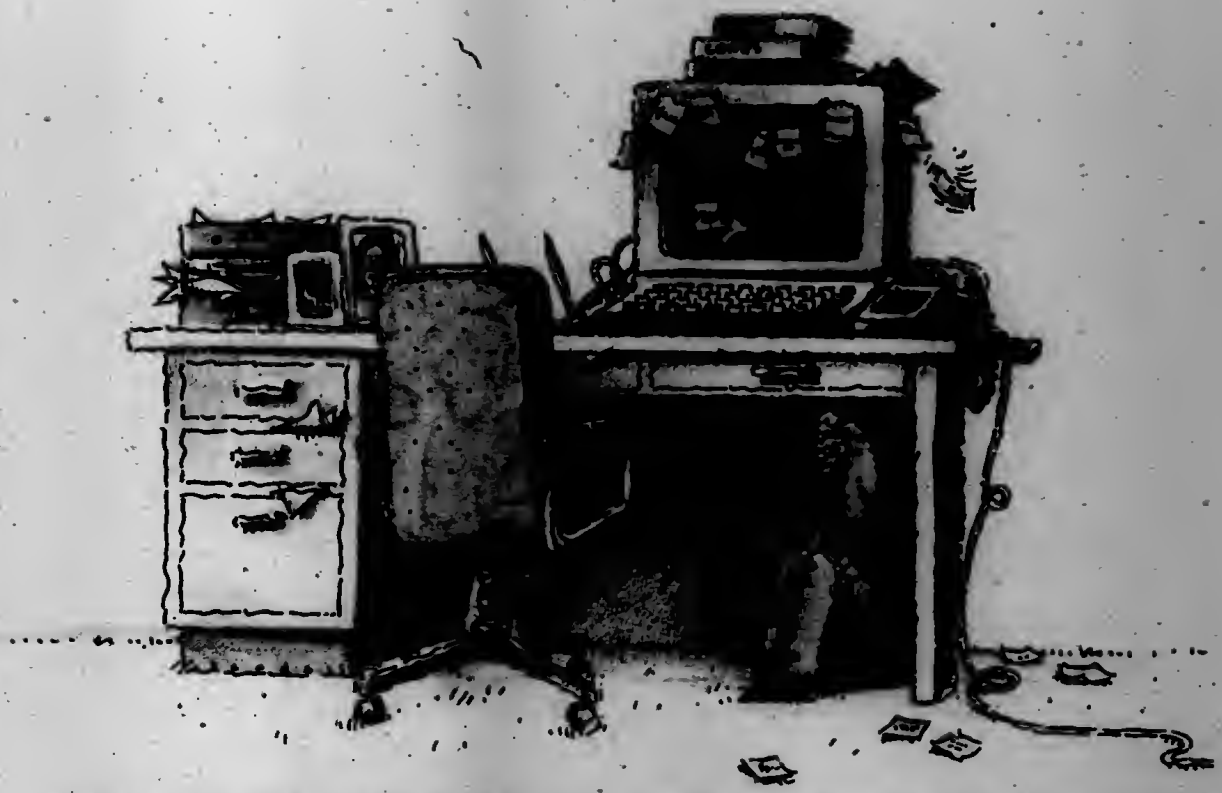

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ware running on the mainframes or minis. Three companies are using IBM's Professional Office System (Profs); two are using products from Wang Laboratories, Inc. and Prime; and a few are playing with a homegrown version. Most respondents viewed electronic mail as a tool for remote locations to talk to one another, not as a replacement for the telephone in a single or clustered environment.

The telephone and the telecommunications function were not viewed as a responsibility of the OA department in a majority of the companies surveyed. Less than a quarter of the people managed the telecommunications department, although many said they believed it should be part of OA. Most of the companies are using private telephone systems and Rolm Corp. was most frequently mentioned.

One aspect of telephone use that seems to be exciting no one at all is its role in allowing people to work from home. Tying a personal computer at home to the company's mainframe via a telephone line may be nirvana to some, but it isn't happening yet and doesn't seem likely in the near future. Although most respondents gave little thought to telecommuting, Harry Oakes, vice-president of Office Systems for Greyhound Corp. in Phoenix, had definite opinions about it. "I don't see it coming. The need for personal contact just won't let it happen." Oakes' sentiments are borne out by a recent survey of 701 knowledge workers contacted by Honeywell Technalysis, a research program sponsored by Honeywell Corp. for its Office Management Systems Division. The study found only 7% would opt to work exclusively at home, and 36% would work half at home and half at the office. An overwhelming 56% said they would continue to go to the office every day even if they didn't have to.

The personal computer may not be playing a part in telecommuting, but it is probably the single most important factor in the growing respectability of OA. Trinet, Inc., a subsidiary of Control Data Corp., recently released a report showing that 51% of executives under 50 years old use computers, and 77% of them have used the machines for less than two years.

The personal computer, which occupies less than one-quarter of the space on an average desktop, is doing for managers, secretaries, chief executive officers and plant personnel what some mainframes did for entire companies a few years ago. It is functioning as a word processor, spreadsheeter, graph maker, communicator, uploader, downloader and file server. The personal computer chosen by all of the companies surveyed in the random sample was the IBM Personal Computer or a compatible machine.

Acquiring a personal computer requires more work than simply filling out a purchase requisition. Most companies insist on either cost or application justification before a personal computer may be purchased. Writing justifications can be very time consuming, and often the paperwork involved hardly seems worth it. Ron Goldfarb, manager of administrative services at Pratt and Whitney Aircraft Co.'s group headquarters in Hartford, Conn., took a different tack from the very beginning.

"In 1981-82, we brought in six PCs as a pilot project," Goldfarb explained. "We chose a cross section of departments to receive them and carefully measured productivity via log sheets. Of course, it couldn't be exact, but the user knew when something used to take two days and now took 10 minutes. After a few months of monitoring, we found that the time saved by going from a manual system to a PC worked out to a 172% to 250% return on investment. This meant that the PC had a six-month payback." Because the initial measurements were so exhaustive, he said, executive management at Pratt and Whitney believes the justification for personal computer applications is already in place.

Although some survey participants

(*Continued on Page 44*)

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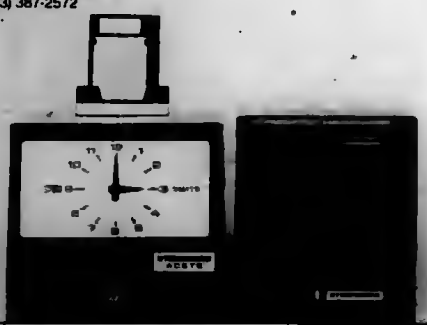

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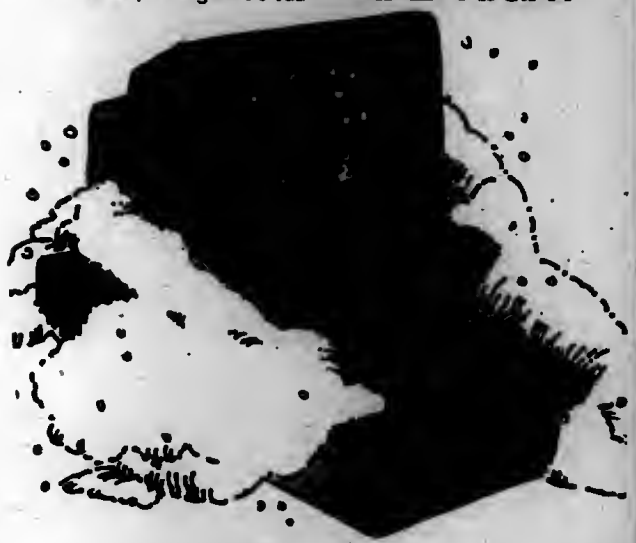

OA Is Affecting Jobs— Who's Managing Those Changes?

By John J. Walsh

An interesting event went almost unnoticed in 1983: The capital investment for the average information worker equaled that for the average factory worker on the assembly line.

This fact will be quite a shock for those of us raised on the Stanford Research Study statistics that state the total capital endowment for the average office worker is $2,000 vs. $25,000 for the average factory worker. An examination of the present U.S. work force will illustrate why this change has occurred: In 1983, information workers occupied more than 55% of all positions within the U.S.

Concurrently, capital investment in computers and communications has grown at such a rapid pace that it now accounts for almost one-third of total business fixed investment. It follows that, because technology typically flows to the most information-intensive areas of any business, information workers have been the primary recipients of both large capital expenditures and the latest information technology.

The implications of the expanding information economy are perhaps most profound in employment, particularly because the flow of high-tech capital shows no signs of early abatement.

History shows that as machines took over the physical labor of workers, the mental efforts of workers became even more important. These workers moved to jobs that machines could not perform. Today's office environment does not offer such opportunities; office technology offers more efficient and less expensive alternatives to office workers. New York University Professor Wassily Leontief, writing about the developing obsolescence many office workers face, drew a comparison between their situation and that of horses after the 19th century Industrial Revolution. "Even if the horses had been willing to eat less oats, tractors would have replaced them anyway," he stated.

As office automation technologies offer vastly improved functionality at lower cost, productivity enhancements in the range of 40% to 60% are now real possibilities, particularly among certain categories of professional and managerial workers. A recent advertisement from a major OA supplier cited a case study in which productivity benefits of 56% were attained by white-collar "professionals" through the use of an integrated OA system.

In response to the increased demand for office technology, senior managers are expressing more concern and interest in exercising control over the use of the technology. Traditional methods of ad hoc short-term acquisition decisions are quickly disappearing. As procurement of office technologies consumes an ever-increasing portion of corporate capital spending, senior corporate managers are demanding scrupulous financial reviews and cost-justification analyses. And no wonder — investing in several personal

computers is a nominal capital investment when the purchase price is $3,000 to $6,000 each.

Consider, however, the organization that acquires 1,000 personal computers. The basic capital investment, which already appears substantial, is in reality probably three to four time larger! The missing figure was composed of additional requirements — installation, educational support, supplies, modems and communications usage, electricity, facilities and maintenance, software procurement and additional system peripherals that are typically added over time.

What initially appeared to be a capital expense of $3 million to $6 million became an inordinately large capital and operational expense more in the range of $9 million to $24 million.

Advanced office systems will enable organizations to distribute more responsibility downward. This downward movement will result in flattened organizational structures and, in turn, will provide opportunities to eliminate many mid-level managers and professionals.

Some companies have used administrative review methodologies and formalized operational/benefit tracking questionnaires to identify direct cost-saving opportunities. By doing so, they have cost-justified significant investment in office technology strictly on the basis of elimination of materials expense and facilities utilization.

Office system technologies can be justified by materials displacement and facilities reduction expense. Nevertheless, many corporations are experiencing an increasing pressure to replace or displace office workers whose skills are no longer required because of the capabilities and efficiencies offered by available office technologies.

The implications of this trend are significant. Advanced office systems will enable organizations to distribute more responsibility downward. This downward movement will result in flattened organizational structures and, in turn, will provide opportunities to eliminate many mid-level management and professional positions.

At the same time, the technology will offer large organizations an opportunity to utilize more and more paraprofessionals in place of mid-level managers and professionals. Many of the paraprofessionals will be women returning to the work force after raising families. Evidence of this trend can already be seen when structural change brought about by the developing information economy is reviewed.

The average corporate staff is distributed as follows: typing (3%), secretarial (10%), clerical (31%), technical and production (6%), scientific/engineering (9%), DP (3%), knowledge (18%), managerial (17%) and executive (2%).

A review of salary costs indicates most salary dollars (about 77%) go to managers and knowledge workers. When executive salaries are added, more than 80% of all salaries are included. Considering that salaries double every seven to eight years, the effect of these figures on corporations is not surprising.

In conjunction with efforts to achieve greater corporate productivity and profitability through use of available information technologies, many corporations are also seriously evaluating basic policies concerning elimination, displacement and employment avoidance of these categories of workers.

Although technological innovation is widely thought to eliminate jobs, high technology is the principal creator of jobs in today's economy. This becomes particularly evident when the growth in high-tech investment from the period 1960-1984 is correlated with the number of employed persons in the U.S. economy for the same period.

Available office technologies are nevertheless significantly changing the way people work and in turn are causing the rapid automation of semiskilled and routine administrative tasks. In this process, knowledge workers, managers and executives are provided significant productivity improvements as the technology enables them to shift from execution to planning, from delegation to participation and from direction to coordination.

To most corporate managers, the establishment of an objective of staff reduc-

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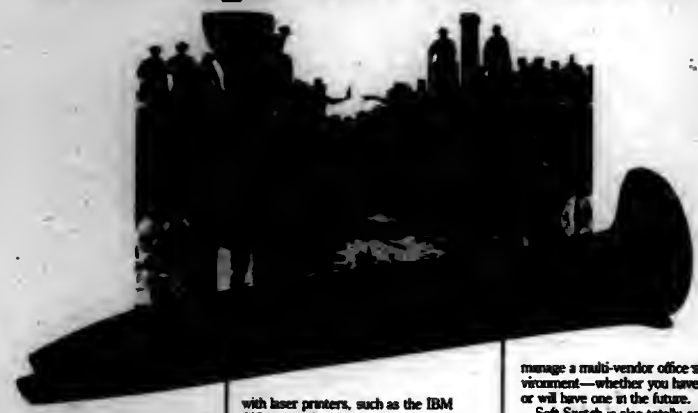

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tions as a result of the introduction of the new office technologies remains an anathema. The reality, however, is that over and over these managers are coming to the conclusion that the new office technologies will result in significant opportunities for middle management staff reductions.

Some significant reactions will certainly result from these trends. The awe and admiration of the new office technologies will be replaced by the realization of the efficiency and productivity opportunities they bring. This awareness will produce strains that will have to be addressed and that will become an integral part of company management and staff relations.

Attention will have to be given to all categories of office workers; no one will be exempt from the impact of technology. Particular attention will have to be given to the new type of skilled office workers who have started to appear in the corporate environment. These people come to their jobs equipped with a basic knowledge of text processing, computing and communications, and they quickly become critical to the functional operation of the particular department in which they work. In many organizations and industries, these new office workers are emerging as a type of office elite.

A strain and division has already developed between these younger office technology specialists and older established office workers who are unable to adjust to the new technologies and accompanying revised processes. OA is in many cases particularly bad news for older workers. Their traditional skills often become obsolete, and many find themselves working under the supervision and direction of younger employees. Because of fear and lack of opportunity to communicate their frustrations, many older workers keep their feelings and opinions to themselves. Although this reserve often leads to passive support of technological change, inwardly these employees react to the new office environment by withdrawing and losing enthusiasm for their jobs. In many cases, the psychological impact of automation can be significant.

Materials	Preautomation Volumes	Benefits (Reduction)
Paper Copies	10,000,000 Pages	50%
Paper Reports	15,000,000 Pages	50%
File Cabinets	10% Office Space	25%
Bond Paper	35,000,000 Pages	50%
Typewriters	800	50%
File Cabinets	2,000	25%

Staff	Percentage Time Daily		Benefits (Reduction)
Creation of Documents	Executive	24%	25%
	Secretary	30%	25%
Information Retrieval	Executive	5%	25%
	Secretary	7%	25%
Time on Phone	Executive	6%	50%
	Secretary	9%	37%

Figure 1. Benefits Achieved by Advanced Multifunctional OA System

Both corporations and office workers have remained relatively passive regarding the employment issues associated with OA technology, but implications for the future indicate that both groups will have to give far more thought and effort to addressing this and other related personnel issues. Failure to do so will result in severe problems.

Recent trends in white-collar union membership show startling increases in the number of white-collar workers who are joining unions and in their increasingly vocal attitudes toward issues such as the use of new office technology, lifetime employment, position reassignment decisions and acceptance of the reductions of staff as a result of technology introduction and resultant efficiencies.

As we develop more and more confidence in OA's ability to assist us in achieving corporate productivity benefits, perhaps it is also time to give serious thought to transition support for workers affected by the technology. This support can involve reeducation, new approaches toward job reassignment, job sharing, extended unemployment insurance, employee transfers between different companies and special severance agreements and payments for those whose jobs are eliminated.

Office automation is real in the benefits it will bring; now it's time to address the implications of change office automation will bring to the office work place and work force. By doing so, we will all be better positioned to achieve the full benefit of office automation and our corporations will be strengthened, both competitively and in terms of employee satisfaction, as they mature in its use.

Walsh is with The Visual Technology Group, Inc. in New York, N.Y.

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Security Pacific Is Banking on Office Automation

By Glenn Rifkin

In November 1978, computers at Security Pacific National Bank became the focus of international attention. A computer consultant named Stanley Mark Rifkin was arrested by FBI agents for using electronic funds transfer to steal more than $10 million from the Los Angeles-based bank. Though the record-breaking heist graphically illustrated the downside of computing, it did little to deter Security Pacific from embracing the technology.

While Rifkin went on to prison, Security Pacific went on to create an innovative and fruitful environment for end-user computing. Though security remains a high-priority item, the nation's eighth-largest bank has not hesitated to spread personal computing and office automation throughout the corporation.

The OA push at Security Pacific actually began in the mid-1970s when the bank had a flourishing word processing center — the largest on the West Coast, according to Irving Margol, executive vice-president of management services. At that time, Margol's industrial engineering department felt that offering a central WP center would alleviate secretarial work loads and cut down the need for additional secretarial help. At its zenith, the center became so productive that it kept three full WP shifts busy.

As WP flourished, the bank's Automated Data Processing (ADP) department was feeling the pressures of managing information flow around the organization. As the '80s began, DuWayne J. Peterson, executive vice-president of ADP, was discovering that the increasing load on the bank's time-sharing facilities and the influx of personal computers was creating a potential nightmare of confusion if end-user computing didn't get the attention and guidance it required.

In 1981, Margol and Peterson joined forces to create an OA steering committee. The committee brought together senior officers from all major units in the bank and then hired two outside consultants to help create a formal charter for OA. Though it has not achieved the success it had foreseen, the OA committee has laid the groundwork for controlled end-user computing throughout the bank. According to Margol, "Things were more technology-driven when the committee was formed. Today, everything is user-driven and we've had to become more user-oriented." Another problem that plagued the committee was that it was simply too segmented to oversee implementation effectively.

The committee has, in fact, evolved into a clearinghouse for major issues (such as health-related questions); strategies for users, ADP and vendors; and corporate directions. For actual hands-on implementation, the committee could not respond quickly enough and turned to ADP to administer a solution. The bank's end-user community was chomping at the

bit for personal computers and ADP was forced to move quickly.

John Singleton, executive vice-president and second in command to Peterson in ADP, pointed out that "Office automation is possibly a term that has come and gone. While we tried to figure out what to do with it, it passed us by. You're really looking at distributed data processing, which is what OA has become. It started as word processing, but has accelerated to where people are now writing applications, becoming quasi-data processors and developing turnkey systems for themselves — with or without the help of DP."

In April 1983, the OA committee chartered the Interactive Computing Division (ICD) within ADP to serve the end users' needs more effectively. It is at the ICD, run by Vice-President James E. Smith, that end-user computing has truly come to fruition at Security Pacific. The division handles all training, acquisitions, consulting and support for micros throughout the bank and has done so without creating the usual tension between DP and end user.

The division received its formal charter after a grass-roots movement developed in the bank; the movement grew out of the frustrated time-sharing environment, according to James D. Brandt, vice-president of microcomputer services. "Once people saw what PCs could do, there was a lot of pressure for this," he said.

In its haste to respond, ADP outlined clear goals. Among the most important was creating an amicable relationship between DP and users. "If you say to the user community, 'I am going to be the czar of OA, and nothing happens unless I approve it,' it won't work," Singleton said. "People will find a way to beat the system. You need to manage the process rather than control it. You do that by education, by being of value-added."

In order to provide value-added service, ICD has created four subgroups to service users: the micro center, an acquisitions facility, the training and support center and an in-house consulting unit.

First, they established the micro center, a store-like facility that serves as the single point of contact on micros for the entire bank. The center carries a variety of micros, printers, plotters and software for employees to examine for purchase. Though an employee can request any personal computer, the center has a core set of "supported" products — primarily the IBM PC and its peripherals — which it expressly recommends. Thus far, the center has installed more than 1,000 micros in the bank and expects that number to double by the end of 1985.

The ICD is also responsible for all volume acquisitions for the bank and handles all training and support for end users. According to Brandt, more than 2,000 employees will take training classes at the center in 1985, and that will keep the five full-time trainers more than busy.

Finally, ICD serves as the in-house consulting unit for all micro-related projects. The group does all front-end needs analysis, which includes getting vendor proposals, installation and follow-up. For Singleton, this cohesive approach to user support is critical.

"We simply take the risk out of these things for the user. After that, the more the users become full-fledged partners in absorbing responsibility, the better. Then they can look upon us as the architects. In OA, you need an architect," he said.

According to Margol, it became obvious early on that even good architects need top management backing to make a plan work. With that in mind, Margol and Peterson invited all of the bank's executive vice-presidents to spend a full day at the micro center "to get an education about office automation." The executives were given hands-on training on personal computers and used such software packages as Lotus Development Corp.'s 1-2-3. There were guest speakers and case studies and some added incentives. "To get a ticket for lunch, they had to sit at the terminal and punch up a specific program," Margol said, smiling. "We made it very friendly."

In fact, the top executives at Security Pacific may have had all the incentive they needed even before attending the micro center class. The bank's president, George F. Moody, had the first personal computer in the bank.

"He was asking so many questions that people started getting personal computers in self-defense," Singleton explained. "It scared them that the president was one step ahead of them."

With Moody's lead and the success of the executive training, Singleton plans to spread the news down, level by level, through all the management personnel at the bank. Although divisions and individual employees are free to request any products, the ICD makes it clear that IBM is the preferred vendor because of its dominance of the personal computer market.

Since 1982, according to Smith, the bank has spent between $10 million and $15 million on micros (about 90% IBM) and no letup is in sight. Because of its huge commitment to the technology, the bank has access to products several months before they are announced. This gives end users added benefit because the micro center technicians can test and benchmark products against other offerings and, on the day a new machine is announced, can give users a clear idea of what it will do for them.

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frame shop, the micro center has taken a stance of "Violate IBM at your own risk." Brandt recalled one user group that insisted on purchasing Apple Computer, Inc.'s Apple IIs and has since replaced them with IBM PCs.

Though the center carries a wide variety of software, it has standardized on Lotus' 1-2-3 for spreadsheet analysis, on IBM's Displaywrite 2 for word processing and on Ashton-Tate's Dbase II for data base management. "We add as demand dictates," Brandt said.

The bank also brought in more than 200 IBM Displaywriters for use at the secretarial level. With the introduction of Displaywrite 2 software for the IBM PC, however, Smith and Brandt agreed the Displaywriter's days are numbered and that IBM will probably cease producing it. They said they have stopped bringing in the Displaywriters.

The bank's president had the first personal computer in the bank. He started asking so many questions that people started getting personal computers in self-defense. It scared them that the president was one step ahead of them.

The center offers access to a broad spectrum of outside data bases, such as Dow Jones, The New York Times, Compuserve and others.

Like other major users, Security Pacific is still seeking solutions to both local-area network and private branch exchange questions. Brandt explained that the center has installed 3Com Corp.'s network using the IBM PC XT as a file server, but is also exploring several other possibilities. Smith added that bids have been submitted by several major PBX vendors — including AT&T, Northern Telecom, Inc., Rolm Corp. and CXC Corp. — for wiring several new bank facilities.

In fact, in October, Security Pacific and MCI Communications Corp. announced a joint nationwide telecommunications network using MCI's Datanet to provide low-cost delivery of financial services to the bank's employees and customers.

Although networking is a concern, the bank has put that on a lower priority level. "It's really an issue of personal productivity," Brandt explained. "We haven't even scratched the surface of personal productivity yet, and we feel no compulsion to be at the leading edge. We have no intention of sacrificing today's users to be at the leading edge."

Though Security Pacific is clearly committed to the influx of technology, it is not doing so blindly. The issues of productivity and cost-justification are of paramount concern and both Singleton and Smith agreed that productivity increases are already being noted. In the bank's commercial lending centers, for example, more than 400 lending officers are being given personal computers to automate their work. The bank is planning to keep the staffing level flat in that area and plans to take on at least 20% more accounts — which reflects a minimum 20% productivity increase.

Despite the optimistic outlook, cost-justification is a strict requirement at the bank. "We have to measure. We just can't assume it's helping," Singleton stated. "I think cost-justification has a broader definition than just dollars and cents. It includes how you plan, how you organize and how you control and direct your work force," Margol added.

The response among bank employees has been overwhelmingly positive. Backlog in the PC area has been brought under control, but office automation has not reduced mainframe backlog significantly because of the enormous growth of the $40 billion bank. The end users, however, have shown remarkable dexterity and innovation when they have gotten their hands on the equipment.

In fact, when Smith went out to identify innovative uses of micros for a technology assessment, he discovered that, of the eight applications he chose, only one had been developed by ADP; the rest were completely user-developed.

Perhaps even greater proof of ADP's success is the recent announcement that it will become a separate division of the bank, operating as the Security Pacific Automation Co. Peterson has been named its chairman and chief executive officer and Singleton its president. ADP had served as an entrepreneurial organization, billing out 100% of its work. Because of ADP's success — a decrease in costs from 26% to 5%, while holding staffing flat for two years — the bank's officers decided it could offer its services on the open market. With a staff of more than 4,000 and total revenues of $280 million, the new company enters the DP service market as the fifth or sixth largest in that business. ■

Rifkin is senior editor at Computerworld Focus.

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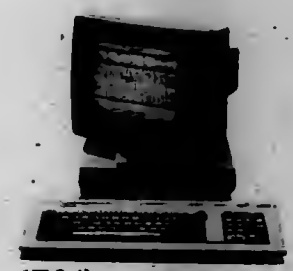

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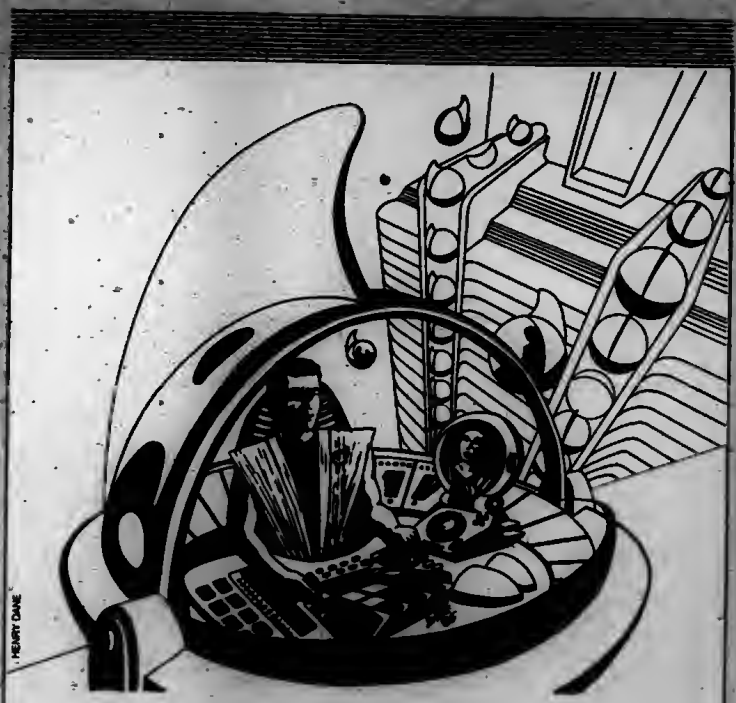

Universal Workstations: Fact or Fantasy?

If the same workstations supported many different levels within an organization, system allocation and integration would be a lot easier. Is this a real possibility?

By Donald D. Bentley

By definition, for a workstation to be universal, it should be all things to all people. Such a workstation must serve executive, managerial, professional, secretarial and clerical staff with equal ease and do all this through a common approach. When we examine universal workstations today, we are really talking about a myth, although some of the products are bringing the universal workstation much closer to being a reality.

An additional requirement for a workstation that is to be considered universal is that it must replace our existing tools — the telephone, calculator, word processor, dictaphone and whatever else presently exists on the desktop as a regular working tool. The user should be able to switch from function to function with relative ease and be able to do more than one activity at any given time.

When the marketplace has arrived at a point where we can truly consider universal workstations throughout an organization, a number of factors will affect the evaluation of vendor offerings, including the following:

- The system should be friendly and should have a pleasant user interface.
- The system should be as personal as a desk and chair are today.
- All functions on the system should be integrated and movement between the applications should be fluid.
- The user interface should be consistent through all applications.
- A portable and/or remote version of the workstation should be available.
- A system (network, output devices and so on) should be in place to support the workstation.
- Users should be able to choose between a keyboard and devices such as the mouse and a joystick, even though the keyboard will probably remain the primary means of interfacing with the system.
- Output to hard copy must be both local and immediate.
- The system should contain a message indicator for electronic mail, voice mail and messages.
- Automatic backup should be available to provide a sense of security for systems users.
- Because all people in the organization will be using the workstations, the system should be somewhat idiot-proof for basic functions.
- Users should be able to engage in and view simultaneous applications processing through windows.

The system must be all things to all people. The applications software within it should be rich in function and matched to needs at all levels. The ideal system would consist of the following:

☐ For word processing, the system should be menu-oriented with prompts, but should also allow proficient personnel to bypass the menus. Deletion should be a two-step process to prevent inadvertent deletion of files. The system should also include the ability to "undo" instructions such as deletions and should be document-oriented to allow fluid movement throughout an entire document and between documents. Function keys or soft keys, not complex coding, should drive the system. A logical Help function should be available. Spelling verification should be automatic through the entire process. Word processing should be considered an office automation application within the entire system, not a standalone function.

☐ The data base management interface should be simple enough to allow it to be used by personnel who are not systems professionals, but merely want to collect and organize information.

As an office automation component, the data base information should be able to be integrated with WP and all other applications processed on the system. The user interface should be menu driven. Audit trails are necessary, particularly for complex applications. Data security and password protection or encryption should exist, and backup should be automatic on the system.

☐ The electronic mail system should contain an in-basket and out-basket and, as closely as possible, should replicate the existing mail system. Prioritization ability is necessary for both the sender and receiver. Annotation (including voice) and forwarding of all electronic mail documents should be possible. The facility for filing electronic messages and mail with textual document files should exist.

All WP, spreadsheet and data base information should be transmittable via electronic mail. Users should be able to access their electronic mail from any workstation, including being able to "listen to" documents from any telephone through voice actuation of textual material. All aspects of the electronic mail system should be

secure, necessitating password protection. Users should be able to output electronic mail to hard copy and should have access to registered mail and an acknowledgment function. The software should accommodate telephone message handling.

☐ The electronic filing system should replicate the filing logic that presently exists in the organization. This statement assumes, of course, that the system in place is suitable for the organization's needs. The electronic filing system should be able to capture, store, display and distribute not only text and graphics, but also images. Data integrity, protection and security are necessary ingredients of any filing system, and flexible document retrieval, including full content search, should be available. Provision for capturing information received from the outside world should also be included in electronic filing capabilities.

☐ In the administrative support function, calendar management should include the ability to view and update, at the viewer's discretion, a day, week, month or year. Scheduling of meetings and project planning tools must be accommodated within the system. Another requirement is for personal and corporate directories, including automatic dialing for voice and data sessions. Bring-forward and tickler files should be accommodated, and it should be possible to access calendars from outside the office. The ability to print a hard copy from outside is also desirable.

☐ Voice mail shares most of its requirements with those needed for electronic mail. It should be possible to integrate voice mail into textual documents, and distribution lists, similar to electronic mail, should also be available.

The foregoing barely touches the surface of a requirements listing for a universal system and universal workstations. Most vendors presently offer pieces of this ideal package. Some recent offerings, among them the Voice Station from Sydis and the Centerpoint System from Santa Barbara Development Laboratories, Inc. are very promising. Although these vendors fail to satisfy every need that exists or represent everything available today, a review of their offerings does provide a representative sampling of what's available and what will be forthcoming from other vendors.

The Sydis system integrates voice, data, text and graphics in one system, and all four can be stored in one document. A critical mass of at least eight workstations is recommended, and the system will handle up to 3,000 workstations. The system works with the private branch exchange (PBX); because the lines are multiplexed, however, only one line is required to handle simultaneous voice and data sessions at each workstation.

Features include voice store and forward, voice annotation of text, up to 10 windows, electronic mail and filing, two WP software options, calendar and meeting manager (with a year at a glance), spreadsheet and a data base manager.

The system has an on-line Help and a Superhelp facility. Most of the user interface is friendly through the use of icons, soft keys and the option of a keyboard or mouse. The system can be keyboard-free for many applications. Storage is impressive — up to 3.2G bytes of internal storage on-line and up to 15G bytes using external mass storage devices.

Average system cost for a configuration that includes 24 workstations is approximately $6,500 per workstation. Systems are available through Sydis and will be marketed by GTE as the Omni-Action system.

Two recent announcements are very promising — the ability to adapt the IBM Personal Computer to make it function like a Sydis workstation (cost projected at $1,000 per station and requiring a minimum of 256K bytes) and the addition of a 5-key telephone line handler.

Santa Barbara Laboratories' Centerpoint system incorporates the telephone, calculator, dictation unit, WP and decision support tools in a very colorful package intended to support a boss/secretary relationship. The workstations differ; the boss has one screen and the secretary has two — a touch screen like that of the boss and a conventional CRT for data and text entry.

Features include WP, a 2,000-name Rolodex, speaker phone, two-year calendar, preprogrammed sign-on for data sessions and extensive use of colored icons. Limited MS-DOS is available. Voice annotation of text and play-back voice mail are possible from remote locations. Document filing is very logical: The system uses file folders and the user can virtually thumb through files. Storage is presently offered at 10M bytes per console.

Two advanced features are particularly interesting. The first of these is the ability to conduct a video conference by means of a robotic color camera directed by touching a floor plan displayed on the workstation screen. The second is a virtual slide projector that allows up to 100 internally stored images to be displayed on the workstation screen or a TV monitor. A two-workstation and printer configuration costs upwards of $32,000, depending on features acquired.

Is the universal workstation a myth or reality? It's still something of a myth, but it's closer to being real. For the time being, we'll have to function with the microcomputer and its limited universality.

Bentley is a partner with Duffy and Bentley Consulting Group Ltd. based in Toronto.

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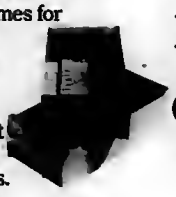

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The Ubiquitous Lap-Size

By Lee White

Scene: Croton-on-Hudson Railway Station, Westchester County, N.Y. Young urban professional steps off the train. Appended to his right hand is what appears to be a very heavy portable sewing machine. He walks in a semi-Neanderthal way, right arm hanging low, stooped over, his obviously custom-tailored overcoat hiked up in back.

The scene above is recreated thousands of times each day. The leather briefcase and *Wall Street Journal* that marked the fast-track worker of the '70s have been replaced by the portable computer, the badge of the up-and-comer today.

The first portable computer was created and manufactured by Adam Osborne in 1981. The Osborne 1 was an 8-bit machine that weighed 23 lbs and cost $1,795, and more than 8,000 of them were sold the first year. Shortly thereafter, other kinds of 8-bit computers, notably Kaypro Corp.'s Kaypro II, also hit the market. Following hard on the heels of the 8-bit machines were the 16-bit computers. The first of these was the Compaq Computer Corp. Compaq, which used the Intel 8088 microprocessor, had a base memory of 128K bytes, a 9-in. screen and a 5¼-in. disk drive. The machine was as close to 100% compatibility with the IBM PC as anything on the market.

Vendor (Model)	Weight (Lbs.)	Operating System	Memory (M in/Max)	System Dimensions (in.)	Screen Type and Dimensions (L lines/Col., In.)	Maximum I/O Ports	Communications	Base Price	Distribution
Data General Corp. *DG/One*	9.1	MS-DOS, CP/M, Venix	128K/512K RAM	13.7 x 11.7 x 2.8	LCD 25 x 80 8.5 in.	2	Asynchronous Optional Built-In Modem	$2,895	Dealers
Grid Systems Corp. *Compass 1100*	10	MS-DOS 2.0, 2.1 Grid-OS	256K RAM	15 x 11.5 x 2	EL 25 x 80 6 in.	2	Asynchronous	$4,250	Direct Sales Force OEM/VAR, Retail Stores
1101	10	MS-DOS 2.0, 2.1 Grid-OS	256K RAM 384K Bubble	15 x 11.5 x 2	EL 25 x 80 6 in.	2	Asynchronous, 1200/ 300 Bit/Sec. Built-In Modem	$4,995	Direct Sales Force OEM/VAR, Retail Stores
1109	10	MS-DOS 2.0, 2.1 Grid-OS	512K RAM 384K Bubble	15 x 11.5 x 2	EL 25 x 80 6 in.	2	Asynchronous, 1200/ 300 Bit/Sec. Built-In Modem	$8,195	Direct Sales Force OEM/VAR, Retail Stores
Compass II 1121	10	MS-DOS 2.0, 2.1 Grid-OS	256K RAM 384K Bubble 512K ROM	15 x 11.5 x 2	EL 25 x 80 6 in.	2	Asynchronous, 1200/ 300 Bit/Sec. Built-In Modem	$5,995 w/128K ROM Pack	Direct Sales Force OEM/VAR, Retail Stores
1129	10	MS-DOS 2.0, 2.1 Grid-OS	512K RAM 384K Bubble 512K ROM	15 x 11.5 x 2	EL 25 x 80 6 in.	2	Asynchronous, 1200/ 300 Bit/Sec. Built-In Modem	$7,195 w/128K ROM Pack	Direct Sales Force, OEM/VAR, Retail Stores
1131	10	MS-DOS 2.0, 2.1 Grid-OS	256K RAM 384K Bubble 512K ROM	15 x 11.5 x 2	EL 25 x 128 8.5 in.	2	Asynchronous, 1200/ 300 Bit/Sec. Built-In Modem	$8,795 w/128K ROM Pack	Direct Sales Force, OEM/VAR, Retail Stores
1139	10	MS-DOS 2.0, 2.1 Grid-OS	512K RAM 384K Bubble 512K ROM	15 x 11.5 x 2	EL 25 x 128 8.5 in.	2	Asynchronous, 1200/ 300 Bit/Sec. Built-In Modem	$7,995 w/128K ROM Pack	Direct Sales Force, OEM/VAR, Retail Stores
Hewlett-Packard Co. *HP 110*	8.5	MS-DOS 2.11	256K/640K RAM	10 x 13 x 3	LCD 16 x 80 9 in.	2	Asynchronous, 300 Bit/Sec. Built-In Modem	$2,995 w/4 software packages in ROM	Direct Sales Force, Dealers
Sharp Electronics Corp. *PC 5000*	10	MS-DOS 2.0	128K/320K RAM	12 x 13 x 3.5	LCD 8 x 80 9 in.	4	Asynchronous	$1,995 w/printer	Dealers
Teleram Communications Corp. *Magnum Kookaburra*	8	MS-DOS 2.0	128K/256K RAM	12 x 11 x 2	LCD 16 x 80 9 in.	3	Asynchronous	$2,795	Direct

Figure 1. Sixteen-Bit Lap-Size Portables

These first portables filled the bill for many organizations, particularly those that, on the ground swell of end-user computing, were looking for innovative machines. Priced in the $2,500 range, the machines could be easily shared by users.

They were also useful for training: trainers could bring the portables with them on their rounds. They also allowed the installation of an internal modem, which allowed people to use emulation software and do mainframe work at home at night or on weekends, when it would not slow down processing speeds for other users.

These portables provided new flexibility and encouraged non-computer users to adapt to computing in their own time and space, but they were still not ideal. The machines were not good for carrying long distances — which for anyone in less than prime physical condition meant more than a city block. The sheer bulk of the original machines caused the adjective describing them to evolve from portable to transportable.

But there is little question that the portable market is here to stay. A recent study by Future Computing, Inc., a market-research firm in Richardson, Texas, showed that, although portable computers make up a relatively small part of the personal computer market today, that part is the fastest growing segment of its market. Estimates have been made that U.S. sales of battery-powered portable computers for office and business use will exceed $3.5 billion in 1989, a seven-fold increase from 1984. The demand is there and growing, and the search is on for a real portable — something that can fit in a briefcase, weigh in the neighborhood of 10 pounds, need no external power source, be really IBM Personal Computer-compatible, talk to a mainframe and have a screen big enough to read and clear enough to see.

Today, a number of companies seem to be near that goal. Data General Corp., in Westboro, Mass, toward the end of last year announced the DG/One, a 9.1-lb portable with a liquid crystal display (LCD). The DG/One, which runs MS-DOS, CP/M and Venix, costs $2,895 for the 128K-byte machine with one 3½-in disk drive. The DG/One seems to be out in front in the lap-size portable race. The random-access memory (RAM) can be upgraded to 512K bytes, more than enough memory to run the 70 programs available in 3½-in. format for the DG/One from 30 software firms. These packages include Dbase II from Ashton-Tate; 1-2-3 and Symphony from Lotus Development Corp.; Wordstar from Micropro International Corp.; PFS:Report, Graph, Write and File from Software Publishing Corp.; and Harvard Software, Inc.'s Harvard Project Manager.

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One early purchaser of the DG/One was Wright Line, Inc., a Worcester, Mass., manufacturer of computer-related furniture. Douglas McCartney, information center analyst, said he believes the machine is a particularly good choice right now. "The worst thing about it is the screen," McCartney said. "You can't see it for nothin' unless you have a desk lamp directly behind you." He noted that it will not be able to function as a real portable under all conditions unless DG offers a solution. DG is now giving away a nonglare screen to offset the problem.

A drawback to all the lap-size portables is their inability to transfer files from the desktops because of the diskette size.

At 24 lines by 80 columns, the screen itself, is "the best around," according to McCartney, who said that, in his experience, some of the better features are the built-in 300 bit/sec modem and the 3½-in diskettes, which are in solid plastic casing.

A drawback not only to the DG/One but to all the lap-size portables is their inability to transfer files from the desktops to the lap-sizes, primarily because desktops use 5¼-in. diskettes. Although external 5¼-in. disk drives are readily available, they are by no means briefcase size, and they take away from the machines' easy portability. Another drawback to the DG/One is its "unique operating system software," McCartney said. "It is MS-DOS, but it's Version 2.11." Most of the better known software programs have been written for MS-DOS, Version 2.0.

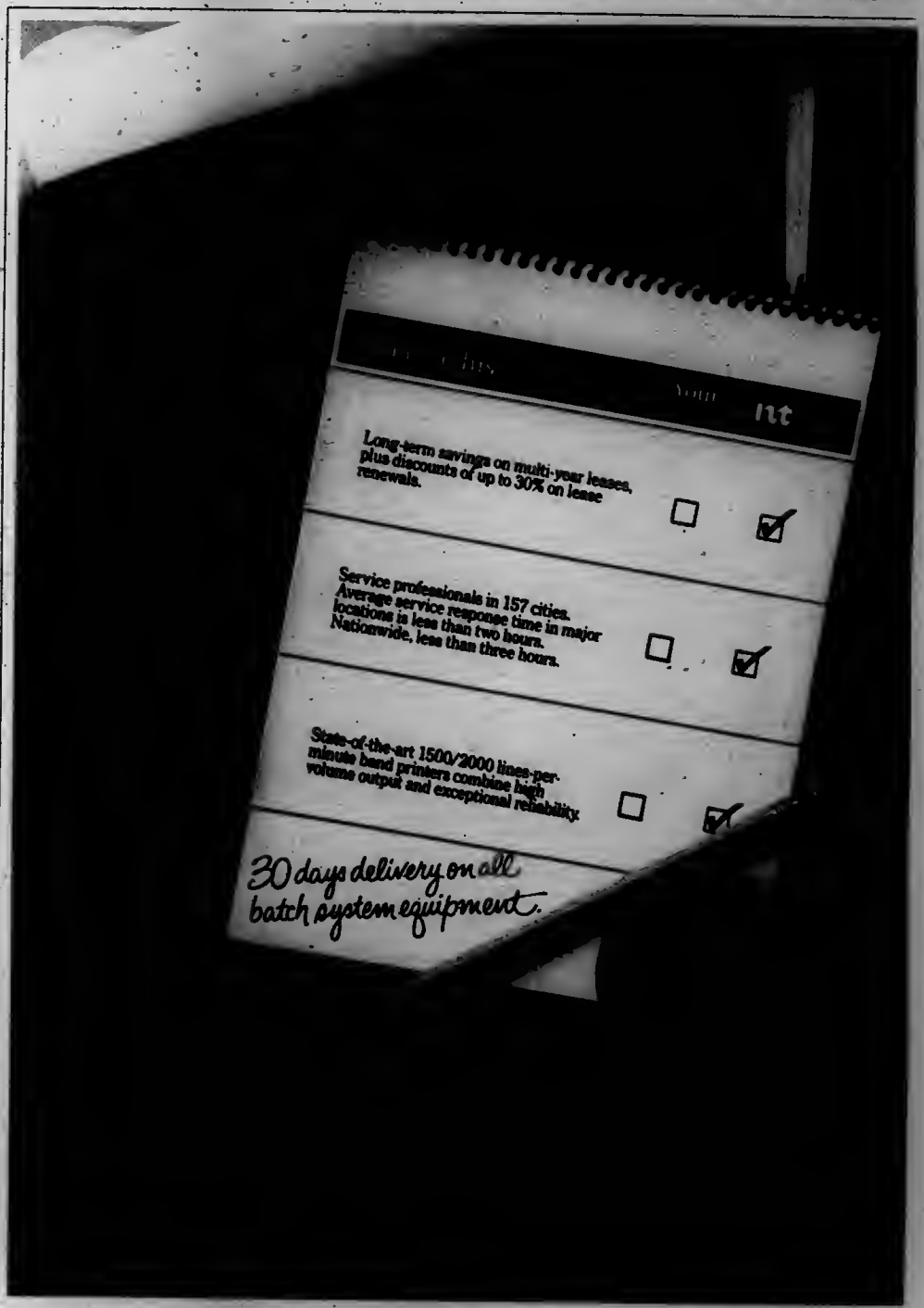
Another manufacturer of lap-size portables is Hewlett-Packard Co., in Palo Alto, Calif. HP offers the HP-110, a 16-bit, 8½-lb portable that also runs MS-DOS 2.11. The HP-110 is priced at $2,995, which includes 256K bytes of memory; expandable to 640K bytes.

A representative from Astra Pharmaceuticals, in Westboro, Mass., has been using an HP-110 for testing purposes, with an eye toward supplying the sales force with portables to use in the field. Astra's idea is that, to improve productivity, it will allow salespeople to carry the portables in their briefcases into customers' offices and to access Astra's mainframe from there. Although the company has not yet tried accessing its IBM System/38, Astra was able to tie into an IBM Personal Computer XT with the aid of the 110's built-in modem.

The HP-110 runs Lotus' 1-2-3 in read-only memory (ROM) via a cartridge and has excellent graphics presentation, according to the Astra user. The screen has very good resolution, but also has one drawback: It is only 16 lines by 80 columns, instead of the preferred 25-line display. However, the user at Astra said, the 25-line displays he's seen have had "terrible resolution. With an LCD display, the more lines the screen has, the longer it takes to refresh the display. The DG/One has sort of broken the display into three parts, but all parts refresh at the same time, and the resolution is not satisfactory."

Teleram Communications Corp. in White Plains, N.Y., has announced its entry into the 16-bit lap-size market with its Dulmont Magnum, manufactured in Australia by Dulmont Electronic Systems. This 8-lb portable features the Intel 80186 processor and uses the MS-DOS 2.0 operating system. The LCD screen is offered either as an 8-line or 16-line by 80-column display. The price of the 16-line display Magnum with 128K bytes of RAM is $2,795.

Perhaps the Cadillac of lap-size portables is the Mountain View, Calif.-based Grid Systems Corp.'s Compass II line. The recently announced models 1131 and 1139 offer up to 512K bytes of RAM, up to 512K bytes of user-installable ROM and 384K bytes of nonvolatile bubble memory that can be used to store files and programs.



Although the Grid line runs MS-DOS, it also — shades of Apple Computer, Inc.'s Lisa and Mac — has its own Gridmaster, Gridpaint and Gridtask software. Of most interest, though, is the fact that it boasts a 25-line electroluminescent (EL) screen. Sam Weigand, Grid's president, claimed that "these EL screens are the most easily read displays available on any briefcase-size computer." The Grid Compass computers must be plugged in unless a battery pack, at $295, is purchased. The EL displays are Cookie Monsters in the way they need power, and the battery is good for only an hour and a half. They can be recharged overnight. Also available for the Grid portables is a 7-lb floppy disk drive that takes 5½-in. diskettes.

Unfortunately, the Grid Systems portable is a Cadillac in more ways than one. The Grid Compass II 1131 (256K bytes) and 1139 (512K bytes), with 300/1,200 bit/sec modem, are $6,795 and $7,995, respectively. That's a hefty price to pay if a company is entertaining the idea of giving a wandering sales force computing capability.

For the lap-size models, the caveat is the same as for the desktops: The shakeout rate for micro manufacturers continues to grow, and one would be well advised to buy a machine made or sold by a company likely to remain on the scene.

Although many vendors have entered the lap-size computer market, two question are on everyone's lips: What will IBM's contribution be to this burgeoning market, and when will we see it? Rather than being first into a segment of the personal computer market, IBM has adopted a "wait and see" posture to determine whether the market will support new entries. If the market appears good, IBM then forges in with guns blazing. The pattern worked in its favor with the desktop computer and the home computer (although its first PCjr fell short of expectations). However, IBM's tardy entry into the portable market has been delaying users' buying decisions.

Bob Fertig, president of Enterprise Information Systems, Inc. in Greenwich, Conn., confirmed that IBM has been buying 3½-in. disk drives. "They've purchased 1.8 million drives from two or more suppliers in Japan. Toshiba is one, and Sony might be another." Fertig said he believes the IBM lap-size, which reportedly may be called Attache PC, will be on the market in the first quarter of 1985. The only stumbling block is getting enough supplies, particularly disk drives. "In fact," Fertig said, "IBM is already showing it to customers invited to Boca Raton." A client of Fertig's, whom he cannot name because IBM required the signing of a nondisclosure agreement, was among the invitees. According to his client, Fertig said, the machine "weighs less than 15 pounds, fits in a briefcase and uses an 80188 processer."

A remaining question is whether the machine will use the LCD or plasma display, according to Fertig, who added, "I'm betting on the plasma." If IBM does indeed release its lap-size, the unit will most probably run a pure PC-DOS. It is also expected that its own recently announced collection of business software programs will be available on 3½-in. diskettes.

Whether users wait for IBM to decide whether the lap-size portable market is worth pursuing or choose to buy one of the 16-bit machines available today, the caveat to be borne in mind is the same as that for the desktop market: The shakeout rate for microcomputer manufactuters continues to grow, and one would be well advised to buy a lap-size computer manufactured or sold by a company likely to remain on the scene.

In the meantime, although there is little doubt that the true portable computer is more than a niche market product and that the 16-bit, IBM PC-compatible portable is already here and being refined daily, perhaps the next subject to be touched upon is the briefcase market.

Let's see now: We need a briefcase large enough and sturdy enough to hold a few customer files, an appointment book, some product literature, a calculator, some business cards, an address book, a change of underwear, a blow dryer, a dop kit and, of course, a 10-lb portable computer.

White is a senior writer at Computerworld Focus.

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The State Of Word Processing

By Ronni T. Marshak

Something rather bewildering is happening in the world of word processing. Vendors of dedicated systems have all seemed to develop an advanced case of myopia. They have lost sight of what good WP is. It isn't enough, any more, to say that "dedicated is better." Personal computer-based WP used to mean Wordstar, which meant confusion and frustration. And the personal computer keyboard was something most people didn't want to discuss.

But things have changed. Microcomputer software has advanced to a level that rivals dedicated systems in functionality and friendliness. In fact, most innovations in WP have happened on the personal computer in the last year. IBM has already fixed the design on the Personal Computer AT and is expected, at any moment, to announce a WP keyboard for the Personal Computer and the Personal Computer XT. There go two of the major advantages for the dedicated.

Lets take a look at the newest trends in WP and see just where the dedicated systems fall short or where they come out on top.

The past few months have been interesting ones in the history of WP. Just when the experts had rung the death knell for dedicated systems, a whole new crop of low-cost stand-alones were released. A perfect example, and one that is most heralded, is the Wang Laboratories, Inc. Office Assistant.

The Office Assistant is a stand-alone WP system targeted for the secretarial desk in small- and medium-size companies. The system sports a bit-mapped display, a keyboard optimized for document production and a subset of Wang's new editor, WP Plus. You can also buy Microsoft Corp.'s Multiplan and Software Publishing Corp.'s PFS software for personal computer functions.

The system sells for approximately $3,000 with printer, and will be sold by Wang Business Centers and National Office Machine Dealers Association who are used to selling into the typewriter and typewriter-replacement markets. This strategy has also been picked up by the new breed of WP systems, the Display Typewriters.

The Office Assistant is priced attractively and has some excellent features. Particularly impressive is the columnar features and math capabilities. However, even this subset of the newest Wang WP is still page bound and does not allow for interactive inserting. You cannot edit insertions until the insert has been completed, nor can you remain in an insert typing mode when entering and editing text. These are two old-fashioned restrictions that keep even the most modern-seeming system in the Dark Ages.

The Decmate III is Digital Equipment Corp.'s offering in this $3,000 range. Although it is basically a subset of the Decmate II, it seems destined to become the strategic terminal for all users of DEC's integrated office system, the All-in-1. Nevertheless, it is a dedicated WP system. And DEC has not improved or updated the software. Although DEC has some excellent features, including bypassable menus, there is a stationary cursor line, (text scrolls instead of cursor) and all typing and editing is done on the bottom line of the display (when editing, you can't tell what is below the line you are on). For years, industry experts have been complaining, but DEC's myopia has overlooked other, more state-of-the-art choices that could have been made.

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Another new low-cost WP system is Wordpal from Wordplex Corp., a major vendor of systems in the UK beginning to make a name for itself in the U.S. Wordpal sells for about $3,000 with a printer, and is a nice little stand-alone unit. But it is also page bound and has some strange quirks which label it as old-fashioned.

The software on dedicated WP systems is just not as slick or as innovative as some of the other WP options. The hardware advantages, which include a production typing keyboard with labeled function keys and minimal disk handling, are not as superior to micro-based systems as they used to be. With hard disks and keyboard templates, not to mention improved keyboard designs, these advantages disappear.

Are there advantages to dedicated word processors? A major area often overlooked is service, training and support. When you buy a microcomputer software package, you are on your own, except perhaps for a toll-free telephone number. Training is provided as a screen-based tutorial. The service contract is between you and your retail outlet. However, Wordpal comes with a two-day training program, customer service representatives and a service contract.

But not all dedicated-systems vendors capitalize on this advantage. Wang has developed a reputation for poor service and being generally unresponsive to customers.

In the past year, as the market for dedicated word processors has declined, vendors have begun looking for a new generation of products and uncovered the electronic typewriters. Many OA vendors have strengthened their positions with electronic typewriter offerings. Among the most notable has been Xerox Corp. whose Memorywriters have added juice to an ailing organization.

Electronic typewriters have never caught on in the U.S. to the degree that they have in the European market. Cost controls are much more stringent overseas and, though they do not have the capabilities of a screen-based system, electronic typewriters often are sufficient for the job at hand. In Europe, Wordplex has been marketing an electronic typewriter networking device that will connect up to 16 standard electronic typewriters to one of its dedicated systems. The same network was offered to the U.S. market; there were no buyers.

But even if they are cost-effective, electronic typewriters

are limited in scope and efficiency. A definite trend toward display typewriters has begun. This past year has brought out at least four such products: Quadrex's Spacewriter, Protypes, Inc.'s Display Typewriter, Samanda's Personal Typing System, and England's Panorama Systems offering. Other similar products such as Minolta Corp.'s PCW-1 combination display typewriter and personal computer are being developed and should be hitting the streets any day.

How do these differ from low-end dedicated systems? In many ways they don't. Both types sell in the $3,000 range, though the display typewriters tend to be a little cheaper. Both come with printers, displays and CPUs. Both have low-end functionality. The differences are primarily in the marketing and secondarily in features.

Display typewriters are sold through typewriter dealers. (Wang's Office Assistant is as well, but that is the exception rather than the rule.) They are marketed as typewriters, not word processors. Features include a typewriter mode for direct printing for such things as envelopes (something word processors never seemed to get right) and forms mapping, the ability to store the format of a standard form.

The personal computer software industry has learned a software package can be both powerful and easy to use.

The Protype system was designed by Steve Kurtin, founder of Lexitron and acknowledged father of display-based WP. This system excels at changing pitch on screen (you actually see the characters in 10, 12, or 15 pitch — and they can be changed at the touch of a few keys), a feature that is simple for a typewriter, but unheard of on a word processor.

Another display typewriter, the Spacewriter by Quadrex, has the functionality of a low-end word processor, but also supports proportional spacing on screen. A typewriter can do this, but it is not available on a standard word processor.

Why are display typewriters cropping up at this point in time? Technology has a lot to do with this, but the emergence of the display typewriter is more a result of what the marketplace can handle. WP tends to be sold through dedicated sales forces. Retail outlets may handle some WP equipment but handle more personal computers. What's left? Dealers. What do dealers know how to sell? Typewriters! And who will these systems sell to? Secretaries.

Although the terminal generation is taking over the world, strongholds of typing power still declare, "Give me white-out or give me tape!" A display typewriter can fit into the secretarial niche with less difficulty than a word processor. Familiarity exists, at least with the name of the product if with nothing else. And for price/performance, the display typewriters have it head and shoulders above the electric typewriters. Bosses will find that attractive.

Personal computer software for WP has grown by leaps and bounds since the early days of CP/M and Wordstar. Early micro-based WP packages offered you a choice: ease of use or power. But the personal computer software industry has better vision than the dedicated vendors; it has learned the two aren't mutually exclusive. A software package can be both powerful and easy, even fun, to use.

Most innovations in WP in the past few years have been on the personal computer level. Soft keys, bypass menus, menus that display at the top or bottom of the writing screen, interactive help facilities and multiple (more than two) windows are all common in the micro world. They are not common in the dedicated world. Microsoft Corp.'s Word introduced the use of a mouse for WP. Aesthetically, personal computer packages make much better use of screen graphics to make WP more appealing.

The hardware is growing up. The IBM Personal Computer keyboard, the nemesis of typing, will soon be corrected, if the grapevine is on target. Hard disks let you write pages and pages of text without running out of room.

Disadvantages do still exist. Though personal computer prices are steadily dropping, the new low-end word processors are slightly less expensive, and the issues of training and support still loom. Nevertheless, several personal computer packages (Word Perfect, Wordstar 2000, Samna and Volkswriter Deluxe) will fulfill almost any secretary's needs. In fact, in a head-to-head test done by a major user of WP, Word Perfect was preferred three to one over the Decmate II.

Which should you get? A personal computer with WP? A stand-alone WP system? A high-end word processor? A display typewriter? The following analogy will help you answer the question: If you want to toast bread, you can buy a toaster oven that will toast, but will also roast, broil and bake. But if all you ever want to do is toast, for the same money you can buy a super deluxe toaster that will toast six slices of bread, each to a different degree of brown. And for considerably less money, you can get a plain old toaster that may not be fancy, but can sure toast bread. Just be sure you'll never want to do anything with that toaster but toast. The toaster is a dedicated system. The toaster oven is a personal computer.

One final word of warning to the WP vendors out there: Daily, the toaster oven is making better and better toast.

Marshak is associate editor, Seybold Publications, at Seybold Co., an OA consulting and publishing company based in Boston.

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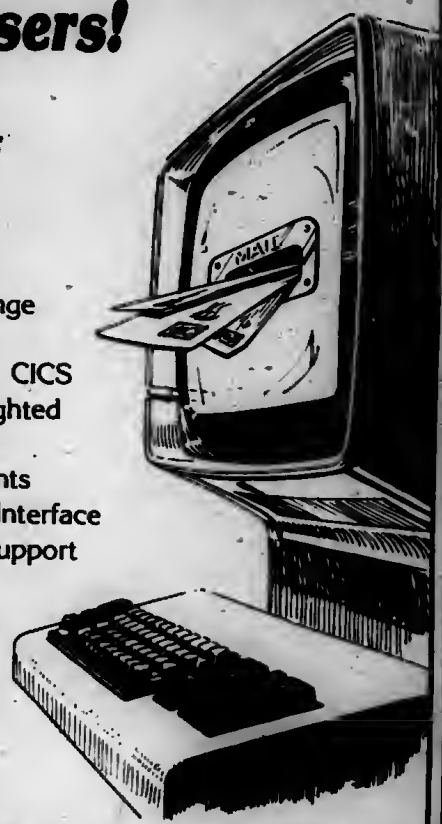

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(*Continued from Page 26*)

see the personal computer as a solution to a problem that may not exist, one company had a serious problem that the personal computer solved.

"Our company manufactures capital goods. During the recession, we had a tremendous downturn and at the same time we were hit with a labor strike. We had to look at how to improve our productivity," said Charles McKellar, manager of corporate MIS at Brown and Sharpe in North Kingstown, R.I. "The chairman of our company bought the first personal computer with his own money. We studied them for some time, then standardized on the IBM. We looked at where they could be used to increase white-collar productivity — management productivity. Now managers are doing quite a bit of their own work on personal computers, and a secretary can be shared by four managers."

Brown and Sharpe also put personal computers into the hands of its quality assurance department in the plant. Perhaps most important, the personal computer helped put Brown and Sharpe, which had been primarily a machine tool manufacturing business, into high tech. They now make machine and instrumentation measuring devices that utilize microprocessors.

Although Brown and Sharpe saw enhanced productivity in terms of a survival tactic, few companies have instituted formal measurement activities to quantify productivity gains. "Measurable is the key word. We haven't attempted it. But people say they know they couldn't do what they're doing without [the computer]," said Oakes of Greyhound Corp. Tom Fahnestock, office systems supervisor at Caterpillar Tractor Co. in East Peoria, Ill., said he doesn't believe measurable productivity gains can be quantified at all.

Perhaps the tasks of productivity measurement and justification procedures will become the domain of the information center, an entity that didn't exist in the U.S. in 1980. Every company contacted in the survey now has, in one form or another, an information center.

By definition, the information center doesn't have a definition. For the purposes of the *Computerworld Focus* survey, it was defined as a physical place staffed by people whose full-time job is to be information center analysts. Almost all respondents met the physical location criterion; about half of those had full-time information center staff. A smaller number had personnel who functioned as trainers or application analysts, but had no real place to call home. These people, in an era of high-tech specialization, are making "house calls."

Most information centers in the surveyed companies had both mainframe and personal computer hardware and software. All respondents agreed that the ideal information center should be a large enclosed area with hardware, software and personnel resources equal to the task.

What all representatives of the surveyed companies had in common was their idea of how the center would change in the next three years: growth, growth and more growth. In each case, the need for information center services far outstripped available resources. The respondents agreed that, even if company growth hit a plateau where no one quit and had to be replaced and everyone was able to use all the available tools, evaluating new products could keep a large staff busy for years to come.

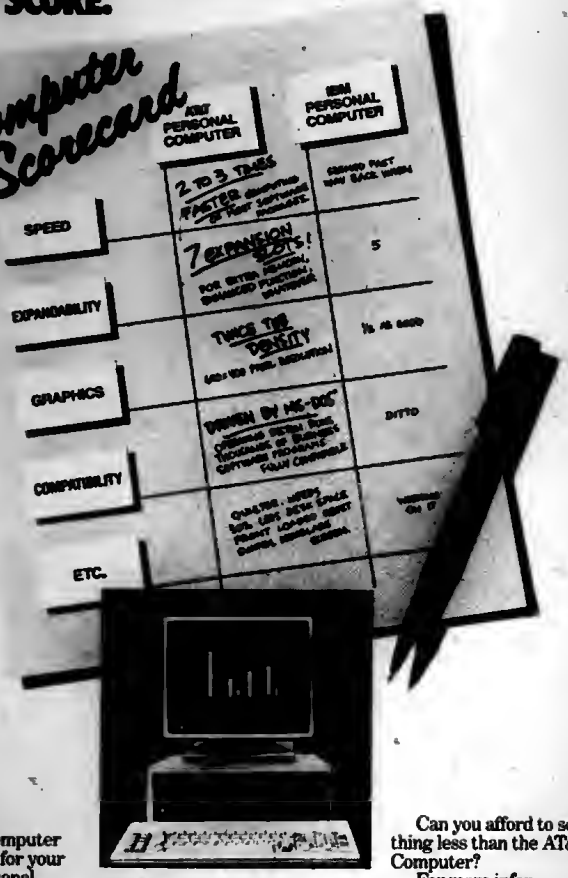
Even respondents who were not directly affiliated with the information centers in their companies were satisfied with the way those centers functioned. In fact, they had few complaints that had not been addressed by either in-house staff or vendors. However, when each survey participant was asked to compile a wish list, 80% asked for the same thing: compatibility across product lines. Even single-vendor companies stated that the compatibility problem, although improving, is not where it should be.

Other frequently voiced wishes included more training, more space on the mainframe, mainframe software packages similar to those available for microcomputers, better documentation from software vendors, advances in the field of artificial intelligence, software evaluation houses and good methods for measuring productivity gains. One manager in a fresh food processing company said there was not enough industry-specific software. In contrast, Jim Johnson, director of information technology at the University of Iowa said almost anything he wanted was out there. His biggest wish: lots of money.

Perhaps the most difficult wish to grant was the one voiced by Bill Todd, director of MIS at Coats and Clark in Doraville, Ga. "We have to have better communications. We have difficulty understanding what our user departments need, and they have trouble understanding the MIS side of the coin." Ed Crowe, vice-president of administrative and information services at Coors Beer in Golden, Colo., may have the solution for Todd. "Over time, as more people become more educated, I see users functioning more independently," he said. "Data processing people have to accept it or they will become absorbed."

White is senior writer at Computerworld Focus.

AT THIS STAGE OF THE PERSONAL COMPUTER GAME, YOU REALLY OUGHT TO KNOW THE SCORE.



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In the News

imaging equipment, telex terminals, advanced phone systems, electronic typewriters, facsimile transmitters and electronic mail from both U.S. and Japanese manufacturers. Among the vendors whose equipment will be used for instruction will be IBM, Digital Equipment Corp., Wang Laboratories, Inc., Xerox Corp., Fujitsu Ltd., Toshiba Ltd. and Canon.

On the Level

Anyone betting the house on the continued tidal wave of personal computer shipments might be advised to take another look. According to Alan Purchase, director of office automation programs for SRI International, a Menlo Park, Calif., consulting firm, the slowdown in personal computer growth is imminent. In fact, Purchase goes further and points out that as the personal computer's popularity dims, the multiuser workstation will become the shining light in the industry.

"Multiuser systems is where future growth is going to be," Purchase stated. "It may take more time for industry to accept that because it takes more time, money and training to implement them. But we predict a major business opportunity in multiuser systems in the 1986-88 timeframe." Purchase explained that personal computers would continue current growth for this year, but would slow down considerably in 1986. He asserted that the reason for the decline would be competition from multiuser systems and the saturation of what he called "early adaptors" to the technology, those high-tech types with a natural interest in computers.

Purchase isolated two additional growth markets: portable computers and integrated terminals with internal storage. Portables will find ready acceptance with a select group of users today, he said, but won't achieve "strong penetration until there is a new display." The liquid crystal displays available currently are "too limiting," Purchase said. "To pay $3,000 for a portable with a marginal display is just not going to make it." He indicated, however, that new displays are under development and the next generation of portables "will be great."

The focus on storage capabilities will shift away from floppy disks to shared, internal storage in multiuser systems, Purchase added, and there is a "major product opportunity" for integrated workstations with internal storage and good displays. "The need for everyone in the office to have floppies on their desk is declining," he said. "Things are becoming more oriented around work groups with shared data bases and memory systems." SRI announced that U.S. shipments for workstations — including personal computers, word processors, terminals and multiuser systems — totaled 2 million in 1983 and 4.5 million in 1984. This year, the growth rate will slow to 20% or 30% and after 1985 will slow down considerably to a 5% or 6% annual growth rate. ■

In Brief

NEW YORK — AT&T guessed wrong on teleconferencing and it has closed its video-teleconferencing service in six of 11 cities. AT&T began its Picturephone Meeting Service three years ago, when the economy was weak, hoping corporations would use teleconferencing to replace costly corporate travel. Another contributing factor may have been the divestiture: AT&T Communications is prohibited from selling the video-reception equipment of AT&T Information Systems.

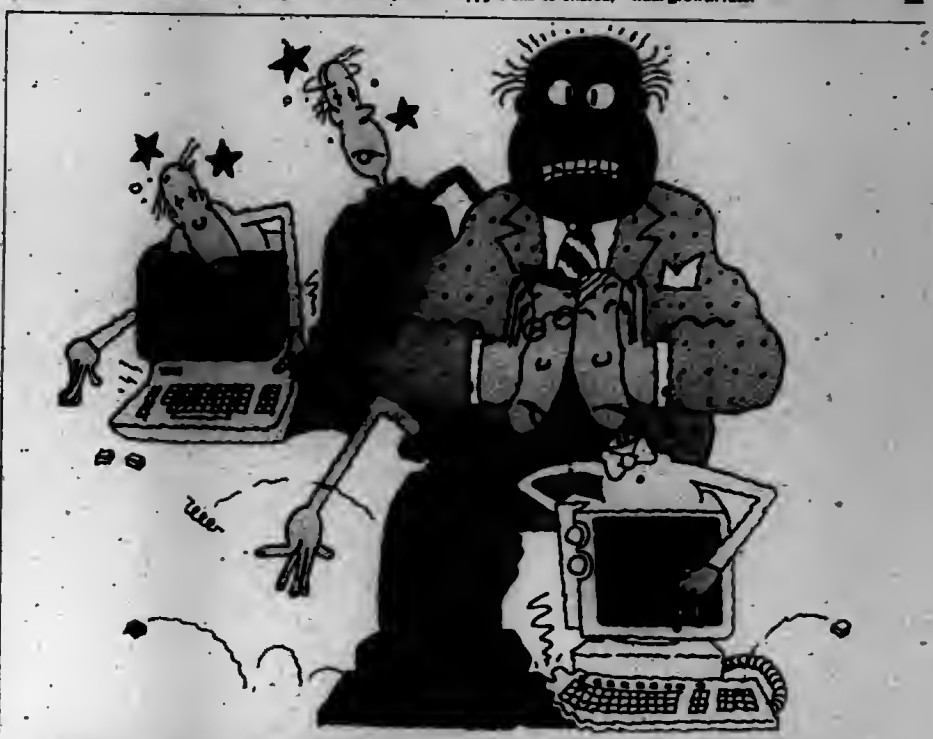
It is estimated that AT&T's loss is between $2 million and $4 million.

WELLESLEY, Mass. — On average, more than 50% of the capacity of each function on an integrated software package goes unused, according to the study "Integrated Software for Personal Computers, 1983-1988," conducted by Venture Development Corp. (VDC), a Wellesley, Mass., management consulting firm. The report stated that manufacturers believe the bulk of their customer market is middle managers, but computer retailers and end users of integrated software surveyed by VDC found that the largest group of integrated software purchasers are professional/knowledge workers, who are generally placed low on the list of prospective buyers by manufacturers.

This report, which costs $2,650, can be obtained from Venture Development Corp., 1 Washington St., Wellesley, Mass. 02181.

NORWALK, Conn. — $12 billion will be spent on executive workstations by 1994, according to a new research report from International Resource Development, Inc. (IRD). Designers try to make the new equipment "user-friendly," but some executives won't be able to handle the new gear, according to Kenneth C. Bosomworth, IRD's president. He added, however, that "by the end of the 1980s, it is going to be important for executives to have several new types of skills." The IRD study predicts that up to 85% of the approximately 600,000 candidates for executive workstations will have them on their desks by 1995.

The full IRD report, "The Executive Workstation," costs $1,650 from International Resource Development, Inc., 6 Prowitt St., Norwalk, Conn. 06855. ■



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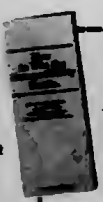

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Products

CUPERTINO, Calif — **Apple Computer, Inc.** introduced Appletalk, the network for the Macintosh Office computers and related peripherals. The Appletalk Personal Network will connect up to 32 Macintosh computers and peripherals. The architecture is layered and nonproprietary, and Apple has published the protocols to encourage developers to create products for Appletalk.

Appletalk and Apple's Laserwriter, a $7,000 laser printer that has Appletalk built in and can be shared by up to 31 people using Appletalk, are the first two announcements in the family of The Macintosh Office. With the expected announcement of other products in the The Macintosh Office, Apple hopes to achieve the goal of establishing Macintosh as "second standard in a variety of business markets."

Appletalk costs $50 per device, which includes the Appletalk connector and two meters of cable, and will be available in March through all Apple distribution channels.

SANTA CLARA, Calif. — **Rolm Corp.** has introduced Cedar and Juniper, two members of its desktop product line that combine personal computers with the Rolm CBX or CBX II Business Communications System.

Cedar, a personal communications computer, combines an IBM Personal Computer-compatible personal computer with a multiline digital telephone. Juniper is a multiline digital telephone that connects to an adapter board that plugs into an IBM Personal Computer. Both Cedar and Juniper connect to the CBX via Rolmlink, a high-speed communications link that provides simultaneous voice, data and control information over a single pair of telephone wires.

Cedar is priced at $4,245, and Juniper at $1,360, both in quantities of 100. For more information, contact Rolm Corp., 4900 Old Ironsides Drive, Santa Clara, Calif. 95954.

TEWKSBURY, Mass. — **Digital Equipment Corp.** recently announced the extension of the Ethernet approach to local-area networks from the baseband to the broadband environment.

The Broadband Ethernet Transceiver (Decom) and Broadband Ethernet Frequency Translator (Deftr) are designed to connect to DEC's Ethernet controllers for VAX, PDP-11 and Professional 300 computer systems. Deftr is used with Decom in single-cable installations to allow Decom to transmit at one set of frequencies and receive on another. Deftr is unnecessary in dual-cable installations because Decom can transmit and receive at the same frequency using separate connection points for each cable.

Available in the spring of 1985, Decom is priced at $4,250 and Deftr is $4,500.

More information is available from Digital Equipment Corp., Maynard, Mass. 01754.

ATLANTA — **Lanier Business Products, Inc.** has developed a VT-100 communications package that provides a link between Lanier business processors and computers from Digital Equipment Corp.

The product reportedly incorporates several features that are not standard on the VT-100, including advanced editing commands, advanced video commands, printer support for both character and line printing as well as disk input/output on Lanier word processing files. The package is available for $500.

Lanier also announced a data base management system for the accounting, legal and insurance professions. The package, called Datamanager II, uses English instructions and, when used with Lanier's One-Step WP package, can do columnar reports, address labels, personalized letters and preprinted forms. Datamanager II is priced at $1,195 from Lanier Business Products, Inc., 1700 Chantilly Drive N.E., Atlanta, Ga. 30324.

EAST HARTFORD, Conn. — **Multimate International Corp.** has announced Multimate Professional Word Processor version 3.30 for the IBM PC. It includes proportional printing, improved repagination and display speed and the ability to edit documents on more than one subdirectory. Multimate 3.30 requires DOS 1.1 or higher, 256K bytes of RAM and two double-sided drives and costs $495. Owners of Multimate 3.22 may upgrade for $50. More information is available from Multimate, 52 Oakland Ave. N., East Hartford, Conn. 06108.

THOUSAND OAKS, Calif. — **Corona Data Systems** has introduced the Corona PC400 Series, an IBM PC-compatible desktop with 640-by-400 pixel resolution and a 14-in. monitor on a pedestal. The graphics adaptor on the motherboard leaves an extra expansion slot. The 16-bit, 8088-based PC400 Series is offered in configurations ranging from $2,650 for a 256K-byte random-access memory (RAM) single disk drive Model 12 to $4,395 for a 256K-byte RAM, single disk drive, 10M-byte hard disk Model HD2 from Corona, 275 E. Hillcrest Drive, Thousand Oaks, Calif. 91360.

LOWELL, Mass. — **Wang Laboratories, Inc.** unveiled its VS 65, a mid-range system in the VS series designed to reinforce the company's departmental-level strength in distributed data processing. The new system includes a new central

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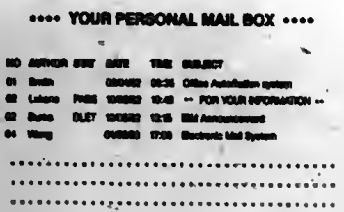

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Products

processor using parallel architecture, a high-speed cache memory and an enhanced bus processor. It has up to 4M bytes of main memory, supports up to 30 users, has the ability to communicate with other VS systems and with host mainframes in a distributed network; supports Wangoffice and has a variety of office automation functions.

A package configuration containing a CPU with 1M byte of main memory, a 5.25-in. 360K-byte diskette drive, remote diagnostics and the operating system, a 147M-byte fixed disk and a 76M-byte removable disk, along with four 4230-VS workstations is available for $54,300.

Wang also announced enhancements to the VS 15 including 2M bytes of main memory and support for external disk drives. In addition, the system will now support a new internal 147M-byte fixed disk drive. For more information contact Wang Laboratories, Inc., One Industrial Way, Lowell, Mass. 01851.

WALTHAM, Mass. — PC Info, a microcomputer relational data base package, was introduced by **Henco Software, Inc.** The product reportedly allows micro users to tap directly into minicomputers. PC Info is compatible with Henco's 4GL minicomputer data management package called Info and has the same screen and report generators, command set, interface to standard data files and relational capabilities.

PC Info offers an upload/download capability that enables users to acess existing Info applications, reports and files on both mini and micro systems. It requires 512K bytes of memory, PC DOS Rev. 2.1, a 10M-byte hard disk and a 5.25 in. diskette drive. It currently runs on the IBM PC XT and IBM PC AT and is available for $1,200 from Henco, 100 Fifth Ave., Waltham, Mass. 02154.

GARDENA, Calif. — A high-resolution desktop image scanner for office automation, the MS-200, was introduced by **Microtek Lab, Inc.** The MS-200, available for $1,700, accepts documents up to 8.5 in. by 24 in., digitizes the images at 200 pixel/in. resolution and transfers the image to host computer memory. Switch-selectable scanning modes include text mode, picture mode and mixed modes. The MS-200 performs Group 3 1-D CCITT data compression at a 10:1 ratio for text and comparable compression ratio for graphics. For additional information contact Microtek Lab, 17221 S. Western Ave., Gardena, Calif. 90247.

MOUNTAIN VIEW, Calif. — **Datacopy Corp.** unveiled its Model 700 Word Image Processing System, which incorporates Datacopy's Wips software permitting image capture and processing. The Model 700 interfaces with the IBM PC's WP and data base management software and operates as a front-end peripheral for the IBM PC XT and PC AT. The system consists of the Model 210 Image Scanner, Model 111 Imaging Interface, Wips software and interconnect cable. The system costs less than $4,000.

Datacopy also introduced an enhancement to its Release 2 Wips software: Character Image Recognition. The software reportedly processes image files of documents that have been scanned by Datacopy scanners and converts the text portions of the documents to standard Ascii code. The Ascii code text can then be processed using standard WP software and reportedly occupies about 1% of the storage normally required for the equivalent file images. The software comes in two versions: CIR-1 is preprogrammed for two widely used office typewriter fonts — 10 point Courier and 12 point Prestige Elite. It is available for $695. CIR-2 is preprogrammed for the same two fonts, but includes an interactive learning capability that reportedly allows the user to train the software to recognize virtually any font or letter pattern, including handwriting. It is available for $1,995 from Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043.

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Feb. 11-12, Princeton, N.J. — **Lotus 1-2-3.** Also, Feb. 25-26, Boston. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

Feb. 13-14, Princeton, N.J. — **Symphony.** Also, Feb. 27-28, Boston. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

Feb. 20, San Francisco — **Database: Executive Strategies for the Information Age.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Feb. 20-22, Chicago — **Info/Software '85.** Contact: Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

Feb. 20-22, Tucson, Ariz. — **Dataquest Industry Conference.** Contact: Jewel Peyton, Dataquest, Inc., 1290 Ridder Park Drive, San Jose, Calif. 95131.

Feb. 25-27, Atlanta — **Information Center Software Selection.** Also, May 20-22, New York. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

March 4-5, San Francisco — **Essentials of Personal Business Computing.** Also, March 11-12, New Orleans; March 25-26, Washington, D.C.; April 1-2, Los Angeles; April 9-10, Chicago; and April 16-17, New York. Contact: U.S. Professional Development Institute, Using Microcomputers for Management, 1620 Elton Road, Silver Spring, Md. 20903.

March 4-7, Atlanta — **Interface '85.** Contact: Program Department, Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

March 4-7, Washington, D.C. — **The Federal Office Systems Expo (Fose '85).** Contact: National Trade Productions, Inc., Suite 400, 2111 Eisenhower Ave., Alexandria, Va. 22314.

March 6-7, San Francisco — **Personal Business Computers for Managers.** Also, March 13-14, New Orleans; March 27-28, Washington, D.C.; April 3-4, Los Angeles; April 11-12, Chicago; and April 18-19, New York. Contact: U.S. Professional Development Institute, Using Microcomputers for Managers, 1620 Elton Road, Silver Springs, Md. 20903.

March 10-13, Reno, Nev. — **Tenth Annual SAS Users Group International (Sugi) Conference.** Contact: SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511-8000.

March 12-13, Chicago — **Data Communications in the Factory.** Contact: Bob Stearn, The Yankee Group, 89 Broad St., Boston, Mass. 02110.

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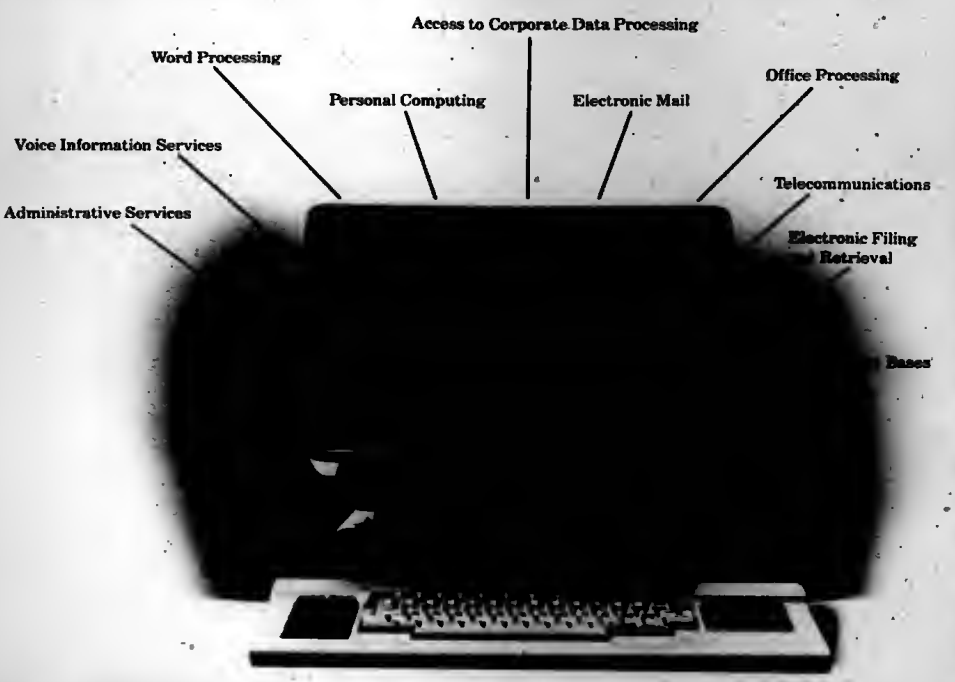

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